NETWORK WORLD

The Newsweekly of User Networking Strategies

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Kodak turns nets over to IBM and DEC

By Bob Brown
Senior Editor

ROCHESTER, N.Y. — Eastman Kodak Co. last week said it will hand over management of its worldwide SNA networks to IBM and enlist Digital Equipment Corp. to take control of its wide-area voice net and other non-IBM data networks.

The deals follow on the heels of a contract Kodak awarded IBM last summer. Analysts labeled it a watershed event because of Kodak's reputation as a leading-edge user.

See related story Page 4

"It will forever change the way computing systems are bought and the way computing departments are managed," said Howard Anderson, managing director of The Yankee Group, a Boston-based market research firm. "Every major company in America will be evaluating outsourcing during the next six months."

Kodak said it expects the contracts to enable the company to focus its energies on what it knows best. "We came to realize that we shouldn't be running a network because it's not part of our core business strategy," said Henry Pfendt, Kodak's director of information technology services.

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ILLUSTRATION COURTESY OF NASA

The Space Station Freedom in orbit above the Earth.

FDDI at the final frontier; IBM networks space station

Advanced IBM LAN products pass NASA tests, paving way for commercial introduction this fall.

By Laura DiDio
Senior Editor

HOUSTON — The National Aeronautics and Space Administration will install an IBM 100M bit/sec FDDI LAN on the Space Station Freedom to link systems used to control and manage the station.

The space station, which will be America's first permanent outpost in space, won't be launched and fully operational until 1995. But IBM has already successfully tested and begun supplying NASA with crucial Fiber Distributed Data Interface components for the mission, according to Gene Ryland. Ryland is an analyst at Lockheed Engineering and Sciences Co., which is working with NASA on the FDDI tests.

IBM's early successes with its FDDI components for the space station bode well for commercial users. Sources within IBM, who asked not to be identified, said that, based on successful FDDI tests at both NASA and the Centre for European Nuclear Research in Geneva, IBM plans to introduce general-purpose FDDI products in late fall.

John Baltz, IBM's manager of future local-area network programs in the Communications Line of Business group in Re-

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HP rolls out RISC servers, net software

Client/server architecture will enable users to distribute processing between minis and PCs.

By Jim Brown
Senior Editor

NEW YORK — Hewlett-Packard Co. last week unveiled 11 new RISC-based local-area network servers as well as client/server software that makes it possible to split application processing tasks between the servers and LAN-attached microcomputers.

The servers, introduced as part of HP's single largest systems announcement ever, are new models of the HP 3000 and HP 9000 minicomputers preconfigured with network software and Ethernet interfaces.

The machines are based on HP's Precision Architecture — an implementation of Reduced Instruction Set Computer technology — and offer three to four times more power than previous models in the minicomputer line.

The client/server software, VPLUS/Windows, includes server and workstation components that enable HP 3000 servers to off-load screen management and forms-generation tasks to user workstations.

The software makes it possible to customize the end-user interface on the microcomputer and save server processing cycles.

With terminal-to-host minicomputer on-line transaction processing applications such as order entry, screen management tasks account for as much as 50% of the required processing power, said Robert Cameron, associate director of research at Dataquest, Inc.'s Northeast office in Boxborough, Mass.

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RBHCs cut back

Company	Staff reductions	Time frame
Pacific Telesis Group	11,000	By 1995
Nynex Corp.	3,000	By June 1990
US West, Inc.	2,000	By March 1990
Bell Atlantic Corp.	1,683	Completed

See story, page 2

GRAPHIC BY SUSAN J. CHAMPENY

New options muddle net optimization

By Bob Wallace
Senior Editor

Rate churn, off-tariff pricing deals and constant change have made optimizing networks for cost a long, arduous process, if not something of a black art.

Users trying to reduce costs are reconfiguring their nets, cutting special deals with carriers and agreeing to certain types of contracts that offer discounts in return for traffic commitments.

But keeping on top of the game is becoming more difficult because of the burgeoning list of available options. Besides contending with the usual rate fluctuations and the advent of new technologies, managers must now weigh the potential benefits of such things as off-tariff pricing deals, outsourcing, buying consortium bargains and promotional discounts.

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NETLINE

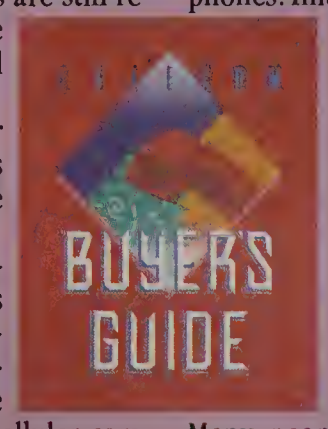
NEWSPAPER

FEATURE

Cellular service options merit close user scrutiny

By Daniel Briere
Special to Network World

Many businesses are still reluctant to embrace mobile personal communications. They prefer older radio technologies or avoid mobile communications, thinking it is too expensive. But as prices drop, companies should take another look at the varied benefits of cellular communications.



In the past, only the elite could afford cellular telephones. Initial models cost over $2,000, and per-minute costs were exorbitant.

Today, cellular phones are becoming as common as microwave ovens. Monthly charges are as low as cable television fees, and usage rates are quite reasonable. Many people undoubtedly re-

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3Com behind Microsoft/IBM plan to meld LAN strategies

The companies hope a consistent LAN Manager approach will spur applications development.

By Bob Brown
Senior Editor

FRAMINGHAM, Mass. — 3Com Corp. executives last week said the company will support an effort by Microsoft Corp. and IBM to develop a unified version of LAN Manager in an effort to spur development of applications for LAN Manager nets.

Separately, 3Com announced the creation of a four-member Executive Committee that will run the firm on a day-to-day basis, carry out its strategic operating plan and speed decision making.

Last November, Microsoft and IBM said they planned to adopt a consistent systems software strategy and to merge LAN Manager with IBM's LAN Server implementation. 3Com, which developed LAN Manager in tandem with Microsoft, was conspicuously absent from that announcement, fueling reports of a rift between the two companies.

By supporting a unified version of LAN Manager, in which LAN Manager OEMs support the same programming interfaces

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RBHC staff reductions a mixed blessing for users

By Bob Brown
and Gail Runnoe
Network World Staff

WASHINGTON, D.C. — Recent work force reductions by the regional Bell holding companies will likely benefit users over time, although customer service may suffer in the short term, analysts said last week.

Over the past month, Bell Atlantic Corp., US West, Inc., Nynex Corp. and Pacific Telesis Group have enacted or announced staff reduction plans, including early retirement incentives, aimed at trimming all levels of management. All told, the plans could cut as many as 18,000 jobs at the four carriers.

Most observers say these measures will benefit users by speeding decision making within the telephone companies, making them more responsive to customer needs. The changes will also lower operating costs — providing funds the carriers may funnel into new services and network upgrades.

"If [the RBHCs] can eliminate tiers of management between customers and decision makers, then it's all for the good of the customer," said Peter Bernstein, a senior analyst at Probe Research, Inc., a market research firm in Cedar Knolls, N.J.

Nynex and Bell Atlantic acknowledged that their moves were designed to eliminate layers of management. "We wanted to cut the number of managers from

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Superservers a threat to traditional server suppliers

Technology emerges to meet evolving user needs.

By Bob Brown
and Gail Runnoe
Network World Staff

The emergence of so-called LAN superservers is putting pressure on traditional computer vendors, which will likely respond to the superserver threat with reconfigured versions of existing product offerings.

Industry analysts say there is a rapidly developing market for superservers designed to meet the needs of high-end local-area net users, including those moving to a client/server environment.

Superservers — which support multiple processors, mainframe-class mass storage and other advanced features — boast greater horsepower than servers based on a personal computer architecture and a better price/performance ratio than minicomputers or mainframes positioned as servers.

Traditional computer vendors say they recognize the growing user need for more powerful servers. But they insist they are meeting current needs with existing products and will continue to enhance these systems as users' requirements evolve.

Analysts say it's unlikely computer vendors such as IBM and Digital Equipment Corp. will offer their own superservers for fear of hurting sales of existing products. They say vendors will probably respond with souped-up versions of current server offerings.

"Computer vendors are going

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Briefs

AT&T files yet another Tariff 12 plan. AT&T last week filed its 31st Tariff 12 custom network plan, a contract projected to be worth $157 million over five years. AT&T withheld the name of the customer. The network will support voice and data traffic among the user's domestic and international locations. It includes 560 data lines, of which 508 will support speeds of 9.6K bit/sec or less. AT&T also confirmed the identity of two earlier Tariff 12 customers — J.C. Penney Co., Inc. and Primerica Corp. The J.C. Penney contract is worth a minimum of $31.8 million for five years, while the Primerica deal is worth a minimum of $51.18 million over three years.

Net co-op answers church's prayers. The First Church of Christ, Scientist in Boston last week said it has joined the American Business Network Limited Partnership, a buying cooperative that combines the purchasing power of its 61 members to secure network equipment and service discounts. The church could reduce its annual $2.5 million telecommunications expenditures by as much as $100,000 by buying through the consortium, according to Earl Potts, manager of The First Church of Christ's Communications Division.

3Com promises NetWare ties. 3Com Corp. officials last week said they are looking into the feasibility of adding support for the Internetwork Packet Exchange (IPX) transport protocol in arch-rival Novell, Inc.'s NetWare to 3+Open LAN Manager's Demand Protocol Architecture (DPA). The DPA software runs in the 3+Open client, enabling the workstation to load and unload a number of transport protocols as needed without rebooting. Adding IPX to the protocol stack in DPA would enable 3+Open client workstations to access both LAN Manager and NetWare servers across the same network.

CSC to expand Infonet in Japan. Computer Sciences Corp. last week said it sold a 5% ownership stake in its Infonet international, value-added network to Kokusai Denshin Denwa, Ltd. (KDD), a Tokyo-based international carrier. A spokesman said that as part of the agreement, Infonet will expand its X.25 network in Japan by linking its one Japanese node with the extensive X.25 network operated in the country by KDD. The Japanese carrier joins the ranks of eight other foreign carriers that own a total of 65% of Infonet.

Harris unloads data group. Harris Corp. of Melbourne, Fla., last week said it sold its Data Communications Division and Lanier Business Systems unit as part of a previously announced restructuring. The Data Communications Division, which is based in Dallas, was sold to Adacom Corp., which markets hardware and software products for the IBM 3270 market. The Data Communications Division is a supplier of terminals, controllers and personal computer network products. Lanier Business Systems, an Atlanta-based unit of Harris' Lanier Worldwide subsidiary, was sold to Syntrex, Inc., an Eatontown, N.J., network systems integrator.

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How Sprint helped over 2,000,000 expectant mothers with their deliveries.

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Codex unveils half-price modem at 19.2K bit/sec

By Paul Desmond
Senior Writer

CANTON, Mass. — Codex Corp. last week unveiled a 19.2K bit/sec leased-line modem priced at $2,995, nearly 50% less than the company's previous 19.2K bit/sec offering.

The new Model 3380 is a leased-line modem that has diagnostic capabilities but is not supported by Codex's net management systems. Still, its price represents a dramatic drop from the $5,250 price tag of Codex's Model 2382, the company's previous 19.2K bit/sec modem in the same category. The 3380 is priced to attract users of 9.6K bit/sec modems of similar functionality, according to Codex.

Analysts said the debut of the 3380 could force competing modem vendors to drop the price of their 19.2K bit/sec modems.

"Probably by the end of March, we'll see announcements in response to this," said Larry Cynar, an analyst with San Jose, Calif.-based Dataquest, Inc. "I would be surprised if we don't see similar product announcements coming out of NEC [Corp.], Fujitsu [Ltd.] and vendors like that."

Thomas Hayes, director of marketing at Codex, echoed Cynar's assessment.

"Essentially, what we're doing is forward pricing," Hayes said. "The prices of 19.2K leased-line modems are going to come down, and Codex is leading that."

Codex is able to offer its 3380 at $2,995 thanks to an improved manufacturing process that cuts production costs.

Codex is not likely to cut the $1,650 list price of its 9.6K bit/sec modem, which has functions similar to those of the new 3380. The company expects users of 9.6K bit/sec modems to buy the 3380 and cost-justify it by using fewer leased lines.

"The users out there running 9.6K bit/sec have been doing so because the cost of moving to a faster speed has been prohibitive," Hayes said. "This changes that significantly."

Cynar said the final price of the 3380 could be much less than the $2,995 list price because Codex dealers will likely pay a lot less than that for the modem.

"I would say their dealers are paying somewhere around $1,600 or $1,700 for that unit, so they could probably sell it at $2,000 or $2,200 and still be making money on it."

The 3380 has the same features as Codex's 2382, such as a two-channel internal multiplexer, which is expandable to six channels, and automatic dial backup and restoral.

However, the 3380 has a diagnostic restoral feature that lets the modem look at the signal-to-noise ratio on the leased line. When the modem is in dial mode following a leased-line failure, this feature ensures that the quality of the leased line is sufficient to carry data before the modem switches back to the leased line.

Also new with the 3380 is the ability to configure remote modems from the local modem. "That's significant," Hayes said. "It saves the cost of having to send people out to the remote location to configure the modem."

The Model 3380 is scheduled to ship next month. Volume discounts and leasing are available, and the product is backed by an on-site, one-year warranty.

Farming out net operations can trigger staffing issues

Employees must be given information about job status as soon as possible to avoid morale crisis.

By Wayne Eckerson
Senior Writer

Many companies spend hundreds of hours examining the financial justifications for farming out network functions, but few are prepared to deal with the staff problems that can arise once an outsourcing decision is announced.

Without proper planning and lots of communication, morale can plummet and many staffers might resign rather than transfer to a vendor company or continue to stay aboard what they believe is a sinking ship.

Some advice

To avoid a crisis, companies need to disseminate as much information as possible to allay employee fears. Employees need to know whether they will be laid off or transferred to the vendor company, whether they will keep their salary and pension, and what rank they will hold in the new company.

More importantly, employees should be given strong financial incentives to stay on during the transition period.

Learning the hard way

Merrill Lynch & Co., Inc. learned these lessons the hard way. In September, the financial services firm announced its intention to let MCI Communications Corp. and IBM enhance and operate its network management facilities. Under the agreement, about half of Merrill Lynch's network management personnel were to be transferred to the vendors' payrolls ("Merrill Lynch to farm out its net management duties," *NW,* Sept. 1, 1989).

But top information systems executives at Merrill Lynch recently backed away from their plan to move employees to IBM and MCI. According to DuWayne Petersen, chief information officer at Merrill Lynch, the decision to farm out network management caused many key staffers to resign, leaving the department shorthanded.

"We are a little bruised right now, and it will be some time before we come back and visit this issue [of transferring employees]," Petersen said. "We have to reestablish our network management organization."

A source at the company said the network agreement created a lot of confusion among staffers about who would lose or keep their job, who was going to be transferred to a vendor company and in what capacity.

The source also said that an internal memo issued last summer announcing the company's outsourcing plans angered many employees because it didn't recognize people who had worked hard for many years at the company and might be laid off or transferred.

Nothing but dollars

While communication is vital to managing staff during an outsourcing deal, financial incentives may be more important.

Last March, American Standard, Inc. announced it was handing over its wide-area network and data center operations to two vendors and laying off all 110 employees working in those areas. At the same time, it told employees the amount of severance pay they would receive and their last date of employment.

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Corrections: Lanier Voice Products' CallWriter software receives call records from a private branch exchange one at a time, contrary to what was reported in the story "PC call-accounting pack supports PBXs, key systems" (*NW,* Nov. 27, 1989). Call records are written to disk 10 records at a time or in 20-second intervals.

In the story "Defense Dept. to embrace ANSI X12 EDI standards," (*NW,* Dec. 11, 1989), the title of Bob Moran was incorrectly listed. Moran is chief of the logistics branch at the Defense Automated Addressing System Office in Dayton, Ohio.

Telecom*USA plans to buy Allnet's parent company

Carrier to acquire ALC Communications for $140m.

By Bob Brown
Senior Editor

ATLANTA — Telecom*USA, Inc., the nation's fourth largest long-distance carrier, last week said it plans to acquire ALC Communications, parent company of long-haul carrier Allnet Communications Services, Inc., for $140 million.

Under the terms of an agreement signed by the two companies, ALC will become a subsidiary of Telecom*USA and will continue to serve its existing markets in the Northeast, upper Midwest and West Coast.

Allnet, which is based in Birmingham, Mich., is the nation's seventh largest long-haul carrier. ALC was formed by the merger of regional carriers Lexitel Corp. and Allnet Communications Services in 1985.

The agreement is further evidence of the consolidation in the long-distance business where competition is making network size an increasingly important survival factor, analysts said.

The combined resources of the two firms will enable the company to better compete for large accounts against AT&T, MCI Communications Corp. and US Sprint Communications Co., analysts said.

Finding stability

The agreement, which is contingent upon regulatory and shareholder approval, is expected to ease financial pressures at ALC, which reported a loss of $9.6 million on revenue of $79.6 million in the third quarter of 1989. The firm reported a loss of $15.8 million on revenue of $99.1 million in the corresponding quarter the previous year.

Under the agreement, which is expected to be completed before June, Telecom*USA will assume about $125 million of ALC's debt.

Some analysts were surprised by the announcement in light of a recent revelation by Gene Gabbard, Telecom*USA's chairman and chief executive officer, that the firm's fourth-quarter earnings would be below analysts' forecasts. The lower than expected earnings are the result of damage caused by Hurricane Hugo and increased usage of volume discounts by customers, he said.

The acquisition promises to be a boon for both carriers' existing customers, according to Mark Kaiser, vice-president of marketing at Telecom*USA.

A major benefit for users is they will be able to complete more calls on net. A customer that does most of its business in an Allnet region but has remote sites in a Telecom*USA region will now be able to support all of those users on a single network, he said.

Additionally, users will be able to receive cost discounts based on the increased traffic and would be able to receive a single bill for all services, he said.

Allnet serves about 400,000 customers, and Telecom*USA has approximately 500,000 customers. Telecom*USA, which was formed in December through a merger of Atlanta-based SouthernNet USA and Cedar Rapids, Iowa-based Teleconnect Co., has its strongest presence in the Southeast and Midwest.

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ICA and NW honor net innovators

The Feb. 1 entry deadline for International Communications Association (ICA)/*Network World's* Call for Innovation is fast approaching.

Through the Call for Innovation, ICA and *Network World* honor network professionals in ICA member companies for creatively applying network technology to solve problems and create new business opportunities.

Call For Innovation

Winners of the fourth annual Call for Innovation program will have the opportunity to present their projects to the ICA membership at a featured session during the ICA 1990 conference to be held May 20 to 25 in New Orleans. ICA will publish a journal of all qualified Call for Innovation papers, and presentations will be considered for publication in ICA's award-winning *Communique* publication.

If you're not sure whether your company is an ICA member, call ICA at (800) 422-4636. You may also contact ICA if your company is not a member but would like to join and participate in the Call for Innovation event.

For more information and an entry form, call Cheryl or Tracy at *Network World* at (800) 622-1108.

Don't be left out. Get the recognition you deserve for your innovative net applications.

AT&T files custom plan for discounted Megacom, SDN

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T last week filed a custom network plan for state and local governments that offers deeply discounted rates on its Software-Defined Network (SDN) and Megacom services.

In a Tariff 16 filing with the Federal Communications Commission, AT&T said that unless it is allowed to proceed with the offer, dubbed State Calling Service (SCS), it "is likely to lose all of its small to midsize government network business" to competitors.

The proposal appears to be an expansion of an earlier plan filed in September that allowed state universities and offices in Michigan to aggregate traffic on a joint SDN network in order to qualify for volume discounts ("AT&T preps service for states, schools," *NW*, Aug. 28).

AT&T will offer two service options under SCS: a discounted SDN plan and a discounted Megacom service. Both options will provide discounts of 36% below tariffed rates on interstate traffic, 25% on intrastate traffic and 15% on international traffic. Users do not have to meet volume or term commitments to qualify for the discounts.

> Unless it is allowed to proceed with the offer, [AT&T] is likely to lose all of its small to midsize government business.
>
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However, the carrier is offering enticements to get users to

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AT&T slams MCI with ethics suit

By Anita Taff
Washington Bureau Chief

NEW YORK — AT&T last week accused MCI Communications Corp. of using unscrupulous techniques to get users to switch long-distance carriers and asked a federal court and the Federal Communications Commission to put an end to it.

AT&T accused MCI of a practice known as slamming, in which customers are switched to a different long-distance carrier without their consent or knowledge. It claims that, in some cases, MCI's telemarketers lied to customers to entice them to switch. For example, AT&T said MCI marketers have told users that AT&T is going out of business, is discontinuing service to some areas of the country or that AT&T has merged with MCI.

Although AT&T says the problem has been confined to residential customers, some observers said AT&T's accusations of unethical behavior could taint MCI's reputation among business users as well.

In its lawsuit, AT&T asked the U.S. District Court for the District of New Jersey to prevent MCI from using such practices and to award AT&T damages for lost revenue and court costs. The carrier claims that 10% to 15% of the customers leaving AT&T have been switched without their consent. AT&T officials said the damages would amount to millions of dollars, although they have not specified an exact amount yet.

AT&T also asked the FCC to change its rules governing the procedure for switching customers to new long-distance carriers. Currently, a carrier needs only a verbal authorization from users, but under the new rules, a written OK would be required.

MCI denied the allegations last week, claiming it conducts periodic checks on its telemarketing operations to ensure that employees' practices are ethical. MCI labeled AT&T's action a "desperate tactic" to stem its shrinking market share. MCI has claimed in recent ads that 100,000 customers are switching

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Peregrine net control tool gets direct link to NetView

By Paul Desmond
Senior Writer

CARLSBAD, Calif. — Peregrine Systems, Inc. last week announced a direct NetView interface for its SNA problem management system, an enhancement that lets users automatically open trouble tickets for NetView-generated alerts.

The PNMS3/NetView Interface helps net management staff respond to problems before they affect end users. It also increases the accuracy and productivity of help desk personnel by reducing the manual entry of data from IBM's NetView net management system to Peregrine's PNMS3 problem management system.

PNMS3 is host-based software for Systems Network Architecture networks that helps users open trouble tickets for network problems and track them through to resolution. The system — which Peregrine claims is used by 200 of the Fortune 500 companies — also includes components for configuration management, financial management and change management, all tied together by a proprietary relational data base management system. It is a competitor to IBM's Information Management problem management system.

Two beta testers of the new PNMS3/NetView Interface expect

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Fresno signs up for ISDN Centrex lines

By Bob Wallace
Senior Editor

FRESNO, Calif. — The city of Fresno, Calif., last week said it ordered more than 400 ISDN Centrex lines as part of an earlier contract signed with Pacific Bell.

Fresno will be the first commercial user of Pacific Bell's Centrex IS Integrated Services Digital Network service.

The city recently signed a 10-year, $2.9 million contract with the carrier for an upgrade from its current analog Centrex to digital Centrex. More than 400 of the total 1,200 Centrex lines will be Centrex IS Basic Rate Interface lines. "We're going from the Stone Age to the Space Age as far as telecommunications is concerned," said Ken Nerland, electronic and communications manager for the city.

Pacific Bell said it has been activating Centrex IS lines at a rate of 25 per week and plans to have all 400 lines in by the end of the month. The city is currently setting up training for city employees who will trade in their rotary-dial telephones for AT&T's 7506 and 7507 ISDN sets.

"There is a world of difference between what employees could do before and what they will be able to do with ISDN. They'll have features [including] automatic callback, messaging and conferencing," Nerland said.

The city will also use the lines for file-transfer, screen-sharing and electronic directory applications.

"We're looking at other applications [such as providing] citywide access to our mainframe from all departments and linking personal computer local-area networks," Nerland said. "But, we've been so wrapped up in training and the cutover that we haven't had time to get into actual application development."

In November, the California Public Utilities Commission approved a provisional ISDN tariff filed by Pacific Bell, which began taking orders for Centrex IS in metropolitan areas on Dec. 8.

Centrex IS ISDN includes three services, as well as two 1B+D services. The second B channel of the 1B+D services will be inactive ("PacBell applies for conditional ISDN tariff," *NW,* Nov. 6, 1989).

Package A supports circuit-switched voice over a single 64K bit/sec B channel with the D signaling channel idle. Package B supports circuit-switched voice over a single B channel and packet-switched data over the D channel. Package C is a 2B+D offering with two voice- or data-bearing B channels and the D signaling channel.

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Informix interface links Wingz spreadsheet, SQL relational DBMSs

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — Informix Software, Inc. last week announced a software interface linking its Wingz graphical spreadsheet to Informix-OnLine and other relational data bases that support SQL.

The Wingz-DataLink interface will be incorporated into the next release of Wingz for the Apple Computer, Inc. Macintosh and into subsequent versions of Wingz that Informix is developing for desktop computers running Unix, DOS or OS/2.

The point-and-click graphical environment of Wingz will enable users to pull host data directly into their spreadsheets or create custom graphical data base applications by using the HyperScript programming language that underlies both Wingz and DataLink.

The idea is to provide an intuitive, friendly front end that makes corporate data base resources available to the casual user, said Douglas Edwards, executive director of software marketing at Informix. "The Wingz-DataLink technology democratizes the corporate computing environment by giving end users easy and fast access to corporate information."

Wingz was introduced with much fanfare in 1988, causing traffic jams on show floors at several computer exhibitions. Actually released just 11 months ago, it has already garnered close to one-quarter of the Macintosh spreadsheet market.

"Wingz is much more than just a spreadsheet," said Jeffrey Bork, vice-president of marketing at Informix. "It was created to become a standard graphical environment for any kind of data manipulation."

Wingz is currently available only for the Macintosh, but a version for Next, Inc.'s new Unix-based workstation is scheduled for release by the end of March.

It will be followed in the second quarter of this year by versions for Unix workstations running under OSF/Motif or Sun Microsystems, Inc.'s Open Look; for personal computers running either DOS under Microsoft Corp.'s Microsoft Windows or OS/2 under Presentation Manager; and for The Santa Cruz Operation, Inc.'s Open Desktop.

All versions will come with the same DataLink interface. The interface is all the front-end workstation or the host data base recognizes, so the host doesn't need to know what type of workstation a query originates from and the workstation doesn't need to know where the reply is coming from.

To serve as a Wingz-DataLink back end, an Informix data base must be equipped with a software module called DataLink Informix-Net. This enables it to communicate across a Transmission Control Protocol/Interconnect Protocol network with workstations running Wingz.

Macintosh users have a second host access option: They can employ Apple's CL/1 connectivity language, which can communicate with a remote data base over direct serial and dial-up modem connections via 3270/Synchronous Data Link Control lines or across any network that supports AppleTalk.

Once a CL/1 connection is established, Wingz-DataLink can access DB2 on an IBM mainframe or on data bases from Informix, Oracle Corp., Digital Equipment Corp., Sybase, Inc. and Ingres Corp. running on a DEC VAX.

Informix said the best fit between Wingz and a data base, however, is the new Informix-OnLine data base for Unix that it released last October. According to the company, Informix-OnLine is the first on-line transaction processing data base to support multimedia data base applications. It lets users integrate such information objects as text documents, graphics, spreadsheets, scanned and digitized images, facsimiles and voice into a single relational data base. Informix plans to release a version of Informix-OnLine that runs as a NetWare Loadable Module under NetWare 386 during the second half of this year and to have the product ported to OS/2 early in 1991.

Key Informix competitors, including Oracle and Sybase, have already shipped OS/2-based SQL data base servers.

"We don't see tremendous demand today for OS/2," said Roger Sippl, Informix founder and chairman, when asked why developing an OS/2 data base server isn't a higher priority at his company.

Sippl said Informix is further distinguished from its competitors by being the only company to offer multiple-platform front ends and by merging office automation software with a data base engine.

"By tying Wingz and Informix-OnLine, they have an edge over competitors such as Sybase and Oracle — especially Oracle," said Bruce Lupatkin, senior technology analyst for Hambrecht and Quist, Inc. in San Francisco. "Informix-OnLine also offers very good object handling, which most of the competition doesn't."

Breaking with tradition in the personal computer software market, Informix will be offering corporate users site licenses to the Wingz front end, which sells for $399 per shrink-wrapped package. Even more unusual, a single license can span any or all of the Wingz versions, making it easier for companies whose networks support different types of desktop environments.

A release date for the Macintosh version of Wingz that includes the DataLink interface has not been set, but an add-on upgrade that will provide DataLink to existing Wingz 1.1 users should be available in March for less than $25, Informix said.

See the FAXNeT Form on Page #59

Worth Noting

During 1989, Apple Computer, Inc. introduced 17 new networking and communications products, according to the company's annual report for last year. More than 70% of all Apple Macintosh computers are now networked, and more than two million AppleTalk nodes are installed worldwide.

People & Positions

William Douskalis recently was named technical director at **Netrix Corp.**, a Herndon, Va.-based maker of wide-area networking equipment.

Douskalis will lead a development group focusing on future product architecture.

Previously, Douskalis was a consultant and systems analyst at AT&T Bell Laboratories and later at AT&T Paradyne.

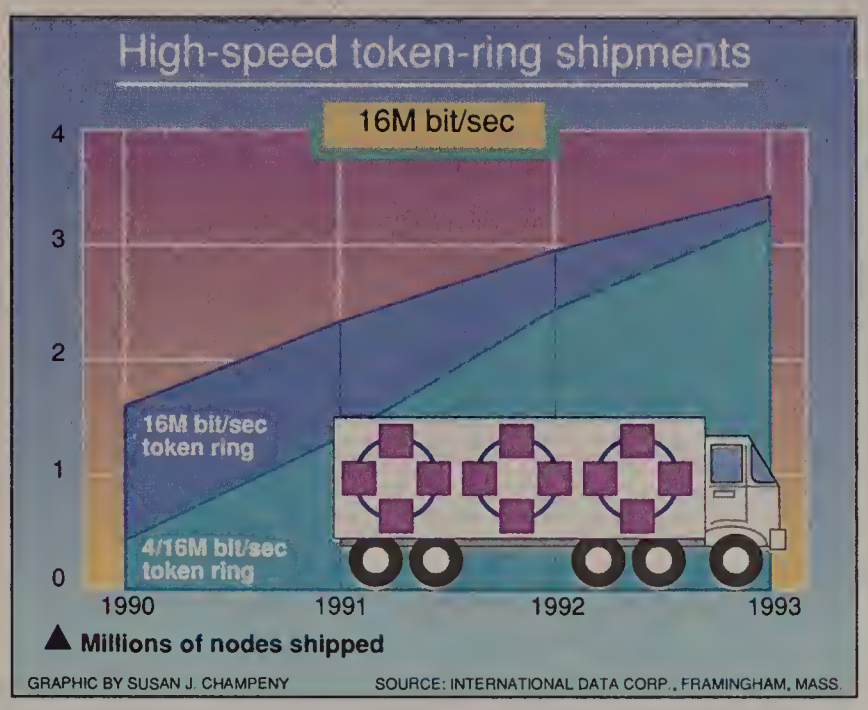
Achille Tedesco has been named president of **Dynatech Communications Division,** a business unit of **Dynatech Corp.** that specializes in network management and data communication products and systems.

Most recently, Tedesco was chairman and chief executive officer of Caelus, Inc., a privately held manufacturing software company.

Codex Corp., a Canton, Mass.-based maker of data communications equipment, has appointed **Bill Brogdon** vice-president of its Western markets.

Brogdon will be responsible for sales and marketing operations in 13 Western states.

Brogdon has spent the past 18 years with AT&T in a variety of sales and marketing management positions.



Chip scarcity may affect LAN adapter

Vendors insist they will meet ship dates for 16M token-ring adapters, but supplies may be thin.

By Bob Brown
Senior Editor

Third-party developers of 16M bit/sec token-ring network adapters last week said that despite an earlier chip delay, they will still deliver products as planned, starting this quarter.

Developers of 16M bit/sec token-ring network interface cards admitted, however, that they still are not receiving an adequate supply of the high-speed token-ring chipsets manufactured by Texas Instruments, Inc. While board makers said they have received enough chipsets to meet initial orders, customers that place new orders may face delivery delays.

> Currently, TI is shipping chipsets in sample quantities to selected customers.
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"If not for the chip delay, no doubt more third-party vendors would have announced and shipped 16M bit/sec products by now," said Martin Sinnott, director of NCR Corp.'s Dayton Development Center in Dayton, Ohio. NCR has announced its intention to enter the 16M bit/sec token-ring market but has not indicated when its products will be available.

The TI 16M bit/sec chipset, which is compatible with IBM Token-Ring Network offerings, quadruples the standard token-ring data transfer speed from 4M bit/sec to 16M bit/sec.

TI, which is the lone supplier of 16M bit/sec chipsets to third-party developers (IBM fabricates its own Token-Ring chipsets), expects to begin making volume shipments of the components in March.

Currently, TI is shipping chipsets in sample quantities to selected customers, including Proteon, Inc. and NCR. This enables the third-party vendors to deliver beta-test versions of their 16M bit/sec boards to some customers now. Third-party vendors expect to meet full demand once the chipsets start shipping in volume.

TI disclosed in December 1988 that it was developing a 16M bit/sec chipset. Company executives expected the chips would ship in volume by the fourth quarter of 1989.

But TI executives realized early last year that demand from vendors who wanted to incorporate the powerful new chip into their products would outstrip limited production capacity.

That forced TI to transfer production to a higher capacity facility last fall. By the time TI started to produce the chip again, volume shipments were pushed back until this March, delaying limited availability to third-party developers who needed the component for prototypes of their 16M bit/sec token-ring boards.

TI alerted third-party vendors early enough last year about the shipping delay so that they did not announce product delivery schedules they could not meet, a Proteon spokeswoman said. Proteon, which is based in Westborough, Mass., did not announce a

(continued on page 14)

Leased-line rates may fall as users convert to SMDS

Carriers may cut rates to move excess leased lines.

By Gail Runnoe
Washington Correspondent

The emergence of Switched Multimegabit Digital Service (SMDS) offerings from regional Bell holding companies, which start rolling out this year, will likely woo customers away from dedicated switched services and could spur leased-line rate reductions, analysts said last week.

Network users can expect prices on leased-line services to fall as users cut over to SMDS services, freeing up private-line capacity. Carriers, in turn, will try to move the surplus of leased-line capacity by courting customers with discounts or other incentives, they said.

SMDS is a high-speed switched digital data service that will enable users to interconnect multiple locations at T-1 and T-3 speeds. Instead of buying their own dedicated facilities, users would be able to purchase bandwidth on demand to transmit data between dedicated access points on the local exchange.

Network users that experience significant usage swings on leased lines are likely candidates for SMDS, said Edward Walvick, director of business development at Nynex Corp.'s marketing and planning group. Earlier this month, Nynex announced plans to offer its own SMDS service later this year ("Nynex service lets users link sites at T-1, T-3 speeds," *NW,* Jan. 8).

"The greatest impact of SMDS will be where people have more capacity [on leased-line circuits] than they use, because they're trying to provide for peak capacity for the few times they need it," he said.

> Users that experience significant usage swings on leased lines are likely candidates for SMDS.
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Although Nynex has not yet set pricing for its SMDS service, which will begin beta-testing early next year, Walvick projected that service rates will be based on a monthly peak usage fee and daily usage charges. Chris Noll, SMDS product manager with BellSouth Services, said the company's SMDS service, which should be available early in 1992, will be based on usage fees.

(continued on page 14)

INDUSTRY BRIEFS

Advanced Micro Devices, Inc. (AMD), last week announced that it and five other vendors supporting the Fiber Distributed Data Interface (FDDI) standard have completed the first interoperability test of the latest FDDI station management working document. The test should make users more confident that the FDDI-based products from the participating vendors will be able to work together once the final FDDI standards are set, an AMD spokeswoman said. Station management is the fourth and final document that must be completed before the FDDI standard can be finalized. It is expected that this will happen by spring of this year, according to industry observers.

Participants in the test were Communication Machinery Corp., a Rockwell International Corp. subsidiary; Fibronics International, Inc.; Proteon, Inc.; Sun Microsystems, Inc.; and Synernetics, Inc. The participants linked their FDDI-based products — including controllers and bridges, which use the AMD chipset — onto an FDDI network and exchanged a set of messages used to provide frame-based network management.

Cisco Systems, Inc., a Menlo Park, Calif.-based maker of internetworking products, last week filed a statement with the Securities and Exchange Commission for a proposed initial public offering of 2.8 million shares of common stock. The offering will raise between $37.8 million and $43.4 million in working capital for the company. Proceeds from the offering will be used for working capital purposes, primarily to finance accounts receivable and inventory, and to acquire capital equipment, the company said.

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Applitek agrees to merge with Australian firm

By Bob Brown
Senior Editor

ANDOVER, Mass. — Applitek Corp., a provider of local-area network backbone products based here, last week announced that it has merged with Computer Protocol Corp. (CPC) of Perth, Australia.

Applitek, which will retain its name, will become a wholly owned subsidiary of CPC, which has operations in New Zealand, Southeast Asia and Europe, in addition to Australia. As a result of the merger, CPC plans to move its headquarters to Andover.

Applitek sells a variety of products that link devices such as workstations to broadband, baseband and fiber-optic LANs. Its product line includes terminal servers, communications servers, bridges and network management systems. The products are mainly used to support the physical layers of the Open Systems Interconnection protocol.

CPC sells a family of multiprotocol communications servers that support the application layers of the OSI model. The products provide a communications link between standard- and nonstandard-based hosts and terminals.

Users will benefit from using both companies' products in the same network, said Asbjorn Sorhaug, president and chief executive officer of Applitek. "Strategically, our merger takes advantage of complementary products and markets," he said.

In fact, the two companies have merged their technologies in the NI10/G-X.25 and NI10/G-SNA gateway products, which are already on the market, he said. Applitek and CPC have worked together for the past four years on several large communications networks in the U.S. and Australia, Sorhaug said. The merger also opens several overseas markets to Applitek, while opening the U.S. market to CPC, said Rouzbeh Yassini-Fard, Applitek vice-president of marketing and sales.

Applitek anticipates revenue of about $5 million this year, while CPC is expected to pull in $20 million in revenue overall.

CPC has approximately 100 employees, including about 30 Applitek employees.

Chip scarcity may affect LAN adapter

continued from page 11

rollout schedule for its 16M bit/sec products until it knew when the chips would be available in volume, she said.

Proteon has been taking orders since late last year and is already shipping limited quantities of its 16M bit/sec boards to selected customers. According to the company spokeswoman, demand for the 16M bit/sec offerings is so high that the thousands of boards to be built this quarter are already spoken for and some customers' orders are backlogged.

"There is a lot of pent-up demand," partly as a result of IBM not being able to meet its demand last year, the Proteon spokeswoman said. Proteon, which typically announces availability of products only when they are in beta tests, announced its 16M bit/sec products early in an attempt to win customers whose needs could not be satisfied by IBM, she said.

IBM conceded that it underestimated demand for 16M bit/sec technology, but a spokesman said the shortage "is in the past tense, as of the end of 1989."

One company that never had to worry about the TI chip situation is Ungermann-Bass, Inc., which designs and makes its own 16M bit/sec chips.

Ungermann-Bass plans to deliver a range of 16M bit/sec offerings at the end of this year, said Paul DePond, the company's director of systems software.

Users contacted by *Network World* said they are excited to test 16M bit/sec token-ring products, but they said interface boards are scarce.

Fortunately, users said, they are only now experimenting with the technology, rather than implementing it into their networks right away, making the product squeeze less painful.

"I don't think most users are feeling any pinch because the 16M bit/sec products are hard to get," said a token-ring user who requested anonymity. "We'd like to start testing the 16M bit/sec products to prepare for the future, but our applications run fine on the 4M bit/sec token-ring networks."

Line rates may fall as users convert to SMDS

continued from page 11

Because SMDS rates are still undetermined, Walvick could not estimate at what point dedicated facilities might be more economical than SMDS service.

Analysts were also unable to nail down a crossover point, but they said it will likely change as dedicated-line fees come down after SDMS services are available.

Steve Sazegari, senior industry analyst with Dataquest, Inc., a San Jose, Calif.-based research firm, said that after users begin to migrate from dedicated facilities to SMDS services, more private lines will become available and carriers will be forced to lower prices to sell them. Nynex's Walvick agreed that private-line rates will continue to fall but said it will be due primarily to competition.

Also, Sazegari said the threat of bypass by alternative carriers will force the RBHCs to lower dedicated line rates.

"SMDS services need to be priced low to draw users away from products they've been using," said Patrick Springer, director of telecommunications industry services at Telecommunications Management Consultants in Needham, Mass.

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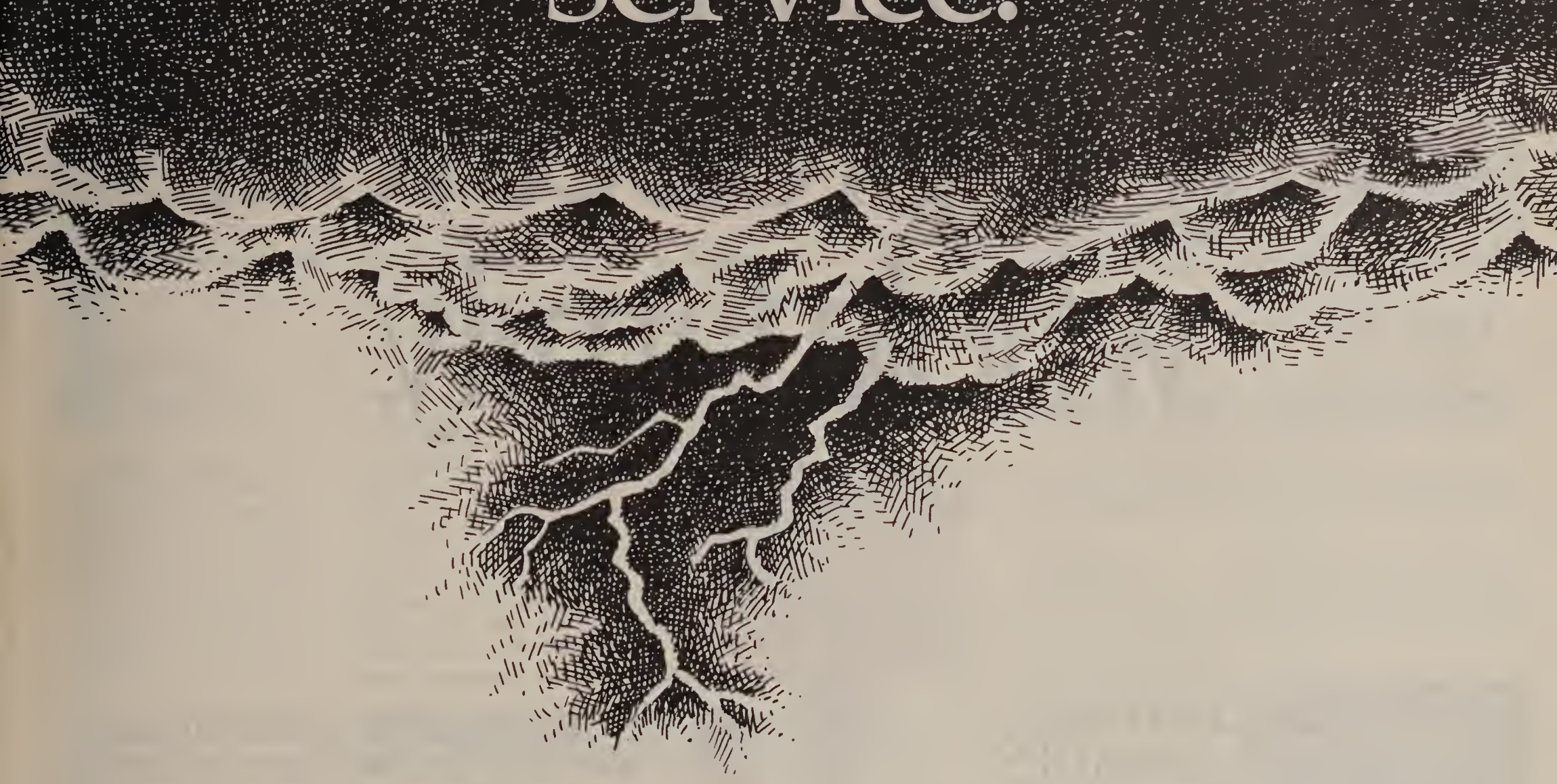

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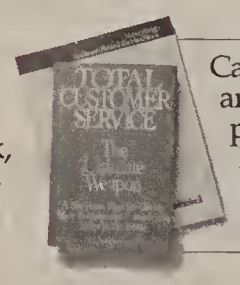

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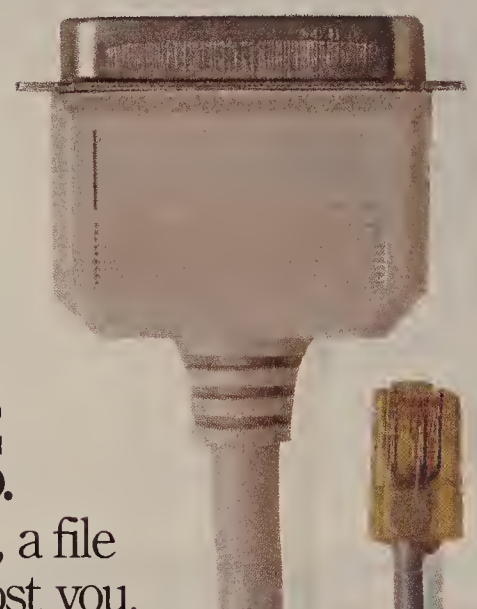

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Worth Noting

Aspect Telecommunications, a San Jose, Calif.-based vendor of automatic call distributors (ACD), recently shipped its 100th Aspect CallCenter ACD to Thrifty Rent-A-Car Systems, Inc. for use in its new worldwide reservation center in Tulsa, Okla. Aspect introduced the CallCenter ACD in April 1987.

Carrier Watch

Verilink Corp., a T-1 equipment vendor based in San Jose, Calif., announced last week an alarm reporting service for users of its extended superframe format (ESF) channel service units (CSU).

The service, available now, is targeted at T-1 network users that cannot afford to monitor the high-speed links 24 hours a day. Larger Verilink customers typically buy the company's Verinet network surveillance software to perform this function.

With the new service, Verilink will use Verinet from its corporate headquarters to poll customers' ESF CSUs using dial-up lines, according to a company spokesman.

The information captured will be reviewed by Verilink technicians and passed on to customers by telephone as necessary. The technicians will inform service subscribers of the type of alarms reported, when they were reported and which node in the T-1 network generated the alarm.

ESF enables users and carriers to monitor the performance of T-1 lines and perform diagnostics without taking the lines out of service.

The company would not divulge pricing for the offering. To order the service, call Verilink's Field Service Department at (408) 945-1199.

NTIA head launches study on telecom infrastructure

Plans to determine if users' future needs will be met.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The National Telecommunications and Information Administration (NTIA) last week launched a study to assess the nation's telecommunications infrastructure and determine whether it will be able to meet users' needs for advanced services into the next century.

> The study will attempt to address whether net modernization is taking place rapidly enough.
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Noting that telecommunications has become a key element in the productivity of U.S. corporations, Janice Obuchowski, head of the NTIA, said it is imperative that officals develop a coherent national policy on communications.

She pointed out that almost all businesses — even heavy industries such as the auto industry, which was once considered low-tech — are becoming increasingly dependent on communications to handle global assembly of parts, inventory management and distribution.

Specifically, the study will attempt to address whether current network modernization is taking place rapidly enough and what role the government should play in encouraging investment in the public network.

The NTIA study will examine whether the government should modify or remove current regulations such as the business restrictions in the Modified Final Judgment, ownership of cable operations by telephone carriers, depreciation rules and rate-of-return regulation.

It will also examine whether the government could promote development of new technologies and services by establishing tax incentives or providing subsidies.

Although industry observers scoffed at the idea of a study examining many of the same issues currently pending before the Federal Communications Commission, Congress and the courts, Obuchowski said she hopes the study will provide a comprehensive synthesis of all activity in the industry.

The goal "is to put together a coherent version of what the telecommunications infrastructure

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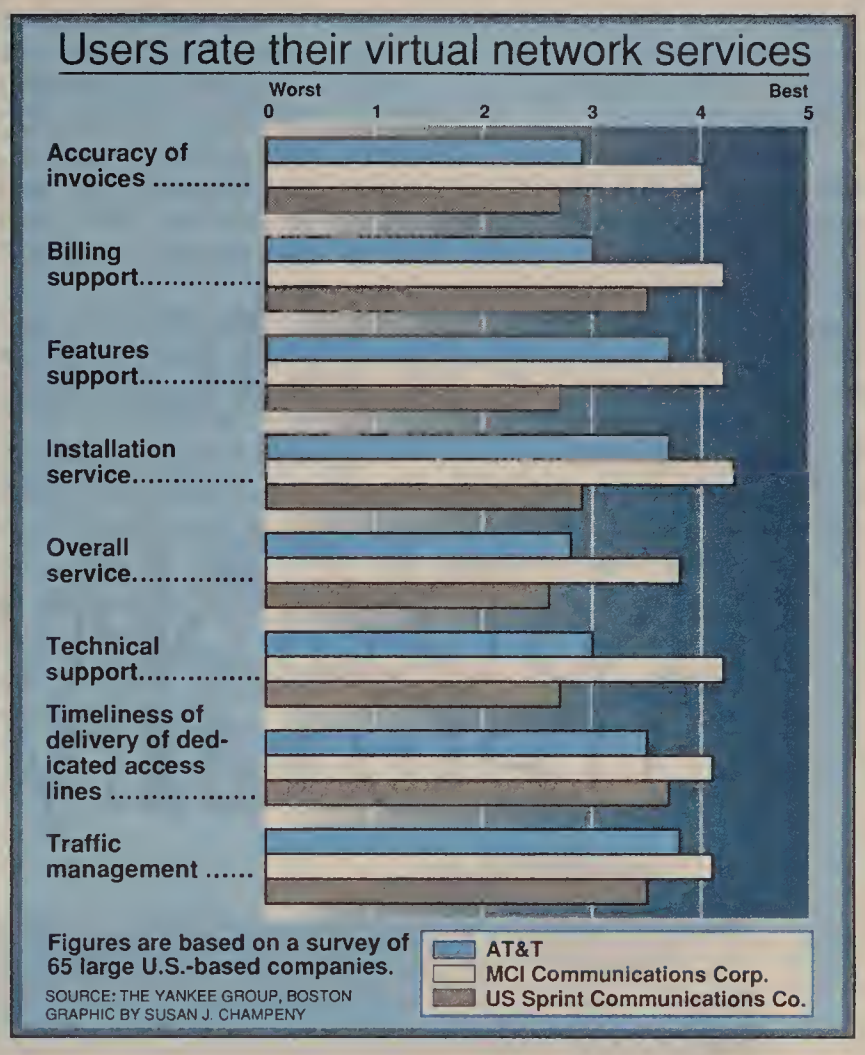
WASHINGTON UPDATE

BY ANITA TAFF

AT&T plans 900 number discounts. AT&T is proposing to expand volume discounts and reduce minimum usage requirements for users of its interactive Dial-It 900 Service. If the tariff takes effect Feb. 22 as scheduled, corporations that use 900 numbers will be eligible for discounts by maintaining a daily minimum average of 2,000 calls or 2,000 minutes of usage. Discounts depend on usage and range from 10% for monthly charges between $50,000 and 100,000, to a 23% discount for monthly charges over $200,000. AT&T also dropped the minimum usage from 2,000 to 1,000 calls per day.

AT&T to add option to Megacom 800. AT&T last week told the Federal Communications Commission it wants to add a new option, called nodal validator, to its Megacom 800 service. The feature, which is already available on AT&T's basic 800 service, allows users to accommodate a high volume of short-duration calls. The new feature would be used primarily by credit card companies and financial institutions for applications such as credit card validation, according to AT&T.

Costs for the service consist of a $50-per-month charge per routing arrangement and fixed charge per call that varies by time of day — two cents during the day, 1½ cents during evening hours and 1¼ cents for night and weekend calls. The nodal validator option is expected to be available for Megacom 800 users on Feb. 22.



MCI prevails as top virtual net provider

Users rate carrier above AT&T, US Sprint in all areas, including performance, user satisfaction.

By Bob Wallace
Senior Editor

BOSTON — MCI Communications Corp. outdistanced rivals AT&T and US Sprint Communications Co. in a recently completed survey of virtual network service users conducted by The Yankee Group, a consultancy based here.

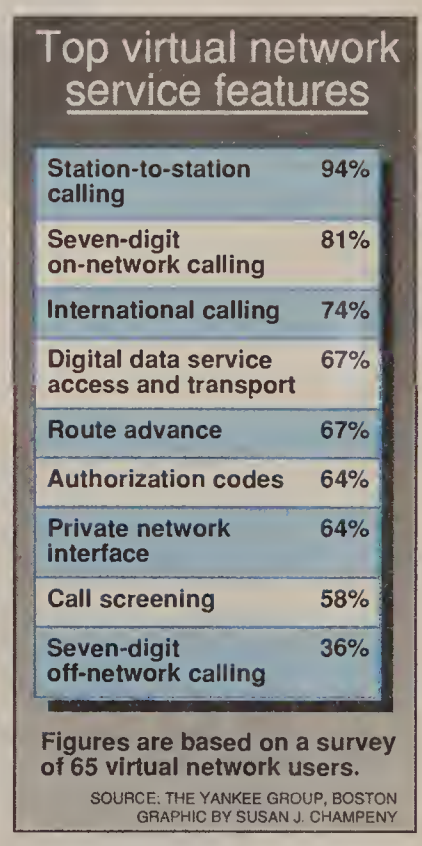
The survey, published in the report "Virtual Networks: The Hybrid Solution," details virtual network use, identifies emerging trends and discusses service enhancements based on the responses of 65 virtual net users.

Virtual networks provide users with private network features, such as a uniform dialing plan and customer-specific call routing, over public switched facilities.

Survey participants were asked to rate their carrier's performance on a scale of 1 (worst) to 5 (best) on installation, delivery of dedicated access, invoicing, traffic reports, overall customer service, features, billing and technical support (see graphics, this page).

MCI swept all eight categories, earning an overall average of 4.12; AT&T finished second in six areas, averaging 3.38 overall; and US Sprint ranked second in two categories, earning an average rating of 3.12. A score of four is above average and a three is average, the report said.

The areas where all carriers need to improve include delivery of dedicated access lines, invoicing, traffic management reports and billing support, according to the report.



MCI received above-average ratings in nearly all categories, pulling in its highest rating, 4.33, in overall customer service. The carrier received its lowest rating, 3.83, in traffic management reports.

In comparison, AT&T's high-

(continued on page 18)

MCI prevails as top virtual net provider

continued from page 17

est rating was a 3.79 in service installation, followed by a 3.77 in both customer and technical support. Like MCI, the carrier earned its lowest rating, 2.93, in traffic management reports.

"The results are surprising," said Cathy Clarke, author of the report and a senior analyst with The Yankee Group. "Most [people] would probably expect AT&T to do the best because of their history of high-quality service. But apparently, MCI has done a fine job pleasing its Vnet customers."

The report also identified several emerging trends.

Slightly more than half of the 65 respondents' networks are used as part of hybrid voice nets, while 37% are configured as stand-alone virtual networks. A small percentage, 12%, use separate private and virtual voice nets, according to the report.

Although AT&T reported to The Yankee Group in early 1989 that half of its Software-Defined Networks (SDN) were hybrid nets, the majority of more recent, first-time SDN customers are smaller firms that migrated from Megacom or private-line services. This brings AT&T's percentage of hybrid nets to one-third, the report said.

Half of MCI's Vnets are hybrids but, like AT&T, more recent customers are using Vnet stand-alone. US Sprint's Virtual Private Network was mainly a stand-alone voice service to begin with, serving midsize and small companies without private nets, the report said.

Sixty-four percent of all respondents run more than half of their voice traffic over their virtual networks, but only 5.2% of the respondents put all their voice traffic on virtual nets.

Of users that split their traffic between private nets and virtual nets, 63% said they plan to maintain their current traffic mix. However, 30% percent of MCI's customers, 29% of AT&T's and 50% of US Sprint's customers are planning to migrate all their voice traffic to virtual nets.

The study also quantified the number of minutes of traffic users are loading on their virtual networks. About 21.6% of all respondents use their nets to support up to 120,000 minutes of traffic per month on their virtual networks; 32.4% run 120,000 to 500,000 minutes of traffic; 29.7% support 600,000 to 1.5 million minutes of traffic; and 16.3% run more than two million minutes of traffic per month.

The report said 18.5% of all respondents have three or fewer sites supported by their virtual networks, 31.5% have four to 12 sites on their virtual nets, 24% have 15- to 30-site nets, 16.7% have 33- to 60-site nets and 9.3% have at least 100 sites on their virtual networks.

Of the top three carriers, MCI had the highest instance of dial-up access. Twenty-eight percent of MCI users said that virtually half of their sites use dial-up access. "This high use of switched access for MCI customers may be because MCI has had a larger percentage of the smaller, voice-only virtual nets relative to AT&T," the report said.

Of the 65 total respondents, 22.9% have none or one site supported by T-1 access to the carrier's point of presence, 27.1% have two to four T-1-supported sites, 25% have five to 10 T-1 sites, 12.5% have 12 to 20, and 12.5% have 20 or more, according to the report.

The study also discussed interest in future service capabilities. Seventy-eight percent of all respondents want the carriers to offer a permanent virtual circuit capability with their offering; 64% want the service to handle protocol conversion; and 63% want a local-area network over wide-area network feature that would enable them to use the virtual net to connect geographically dispersed LANs.

NTIA head launches infrastructure study

continued from page 17

should be into the next millenium," she said.

Some telecommunications providers have invested heavily in the network, but "there is some concern about whether the pace is fast enough," Obuchowski said.

NTIA wants to learn whether government involvement will be necessary to make new technologies, such as fiber to the home and the ubiquitous deployment of Integrated Services Digital Networks, a reality.

A wide scope

The study will go beyond the traditional public switched network and examine new communications services available through private networks, value-added networks, cellular services, paging networks, shared tenant services, metropolitan-area networks, teleports and cable television systems.

In the U.S., telecommunications decisions have been largely reactive, according to Obuchowski. "Customer demand tends to govern the rate of deployment of new technology," she said.

However, it is unclear whether this will result in technologies being introduced fast enough to compete with other countries where telecommunications development is driven by long-range, government-supported programs.

A handbook for the future

Obuchowski also emphasized that she wants the study to result in a practical guide that officials can use when making policy decisions in the future.

To that end, the study will also address the financing of the network of the future.

Obuchowski acknowledged that money is tight in Washington and that some type of self-generating system will be needed to pay for new technologies.

"Today's application backlog is such a nightmare, it'll take more resources to fix it than even IBM has."

–a software developer

"You're right."

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Announcing AD/Cycle: The first fully integrated, total SAA, start-to-finish working environment for creating and maintaining applications.

From IBM. And friends:

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With eomputers humming along at 100 million instruetions a seeond, it seems insane, but it's true:

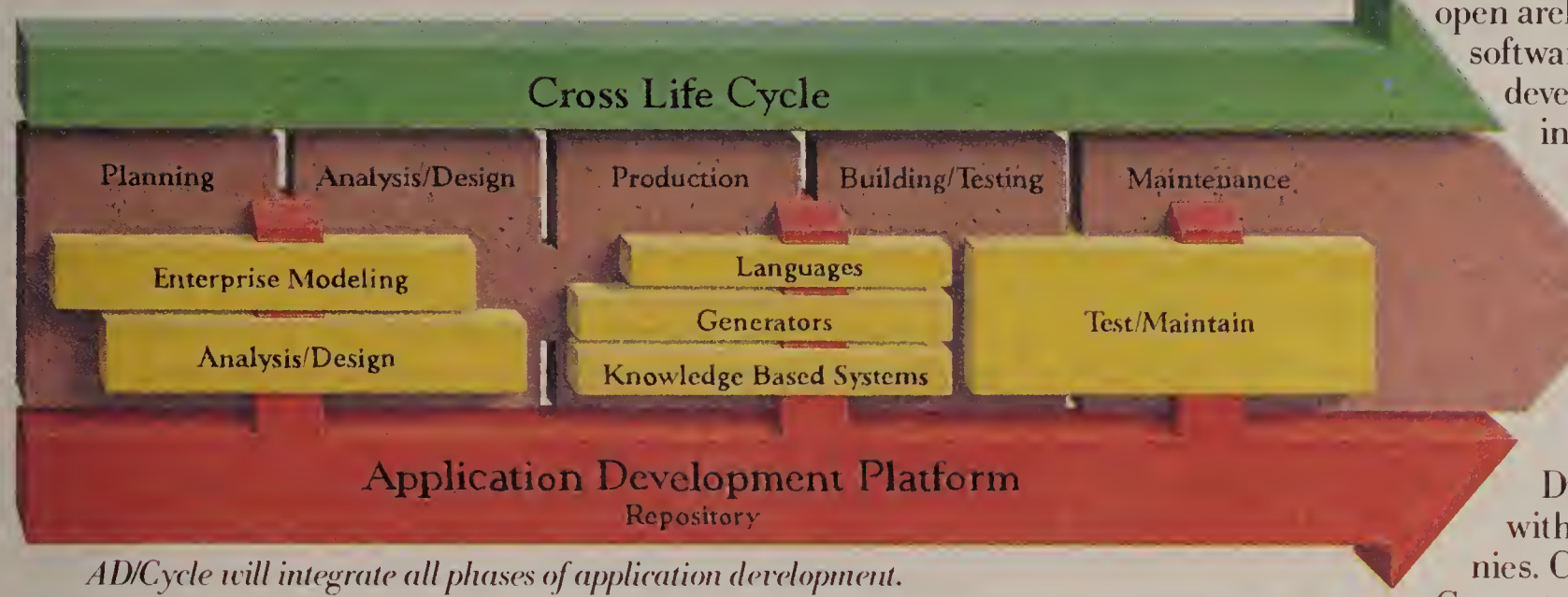
Programmers are averaging about 10 lines of eode a day, and applieations are baeked up 2 to 3 years.

Worse, applieations now take so long to ereate, they ean be obsolete before they're finished. And when they are finished, they require so mueh maintenanee, many programmers don't have time to write anything new.

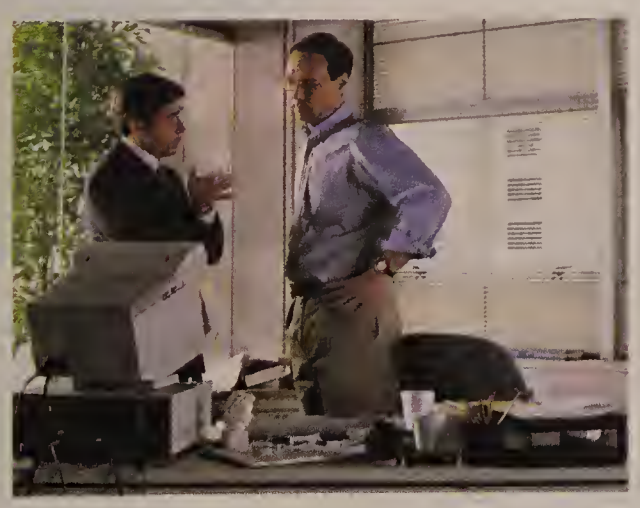
It's a bigger problem than IBM, or anyone else, ean handle alone. So our solution, AD/Cyele, teams IBM with some speeial IBM business partners.

And beeause you ean't wait, many AD/Cyele produets are available now.

But before getting into who's offering what, let's look at what AD/Cyele is, and why it is *the* develop-ment solution for the '90s.



AD/Cycle will integrate all phases of application development.



With AD/Cycle, planners and programmers can speak the same language.

The Right Idea.

To begin with, AD/Cyele is a framework that gives the entire devel-opment eyele something it never had before: a eonsistent set of standards. Within it, all phases of the proeess (see diagram) ean be eoordinated.

It's an arsenal of tools, too: CASE tools for planning, analysis and design, a variety of 3rd-generation languages, applieation generators, knowledge based systems, testing and mainte-nance tools, plus eross life-eyele tools that tie everything together.

And, beeause a real obstacle to getting applieations done right is getting people to eommunieate, AD/Cyele also offers a repository for sharing information: details about a eompany's strueture and methods, expressed in a uniform way, to keep exeeutives and programmers on the same wavelength.

Thanks to SAA™, these pieees not only will fit together but ean produee eode for multiple IBM operating systems. And you ean use as many, or few, AD/Cyele tools as you need.

The Right Tools.

AD/Cyele has too many tools to describe them all, but here are some highlights.

Along with produets from IBM, key elements of AD/Cyele are eoming from BACHMAN Information Systems, Ine., Index Teehnology Corporation and KnowledgeWare, Ine.™

Eaeh is a leader in CASE teehnol-ogy, with produets that reduee years to months, and months to days.

Their sets of tools will eombine en-terprise modeling, validation of models, data strueture analysis and more, all using the graphieal interfaee of SAA.

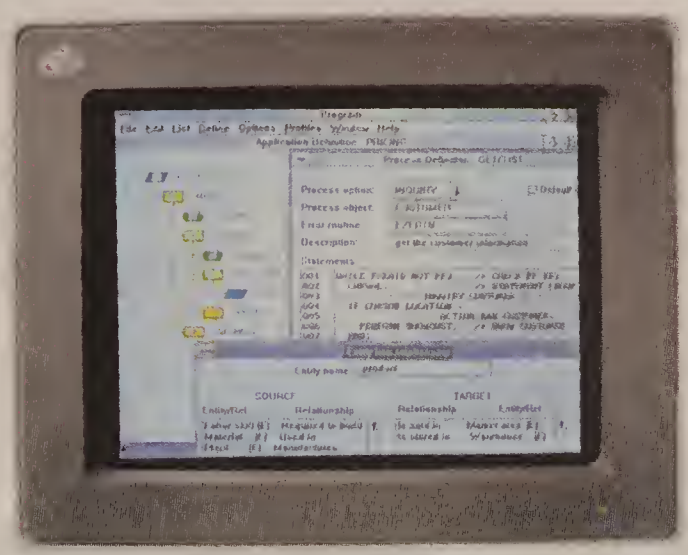
In addition, new releases of IBM Cross System Produet (our applieation generator) will run on both OS/2™ EE workstations and hosts. Through CSP, many AD/Cyele tools can build appli-eations for all SAA systems: OS/2, OS/400™, VM and MVS.

And beeause AD/Cyele is an open arehiteeture, many other software vendors are ereating development tools that will integrate with it, taking full advantage of IBM's repository manager.

Right Now.

To help you get going with AD/Cyele, IBM's Systems Integration Division is joining forees with leading serviee eompa-nies. CAP Gemini Ameriea, Computer Power Group, Computer Task Group and GE Consulting will be working with us to assist you in plan-ning, training and implementation.

OS/2 EE versions of AD/Cyele tools will arrive through 1990, but you don't have to wait to get started. Many tools are available now, and with exeellent traek reeords.



All AD/Cycle products will have the easy-to-use, SAA graphical interface.

Response to AD/Cyele, from both vendors and users, has been overwhelm-ingly positive. Clearly, it represents the future of applieation development.

So for you, the question isn't if, but when. And when is now. To get started with AD/Cyele, eall your IBM Marketing Repre-sentative today.

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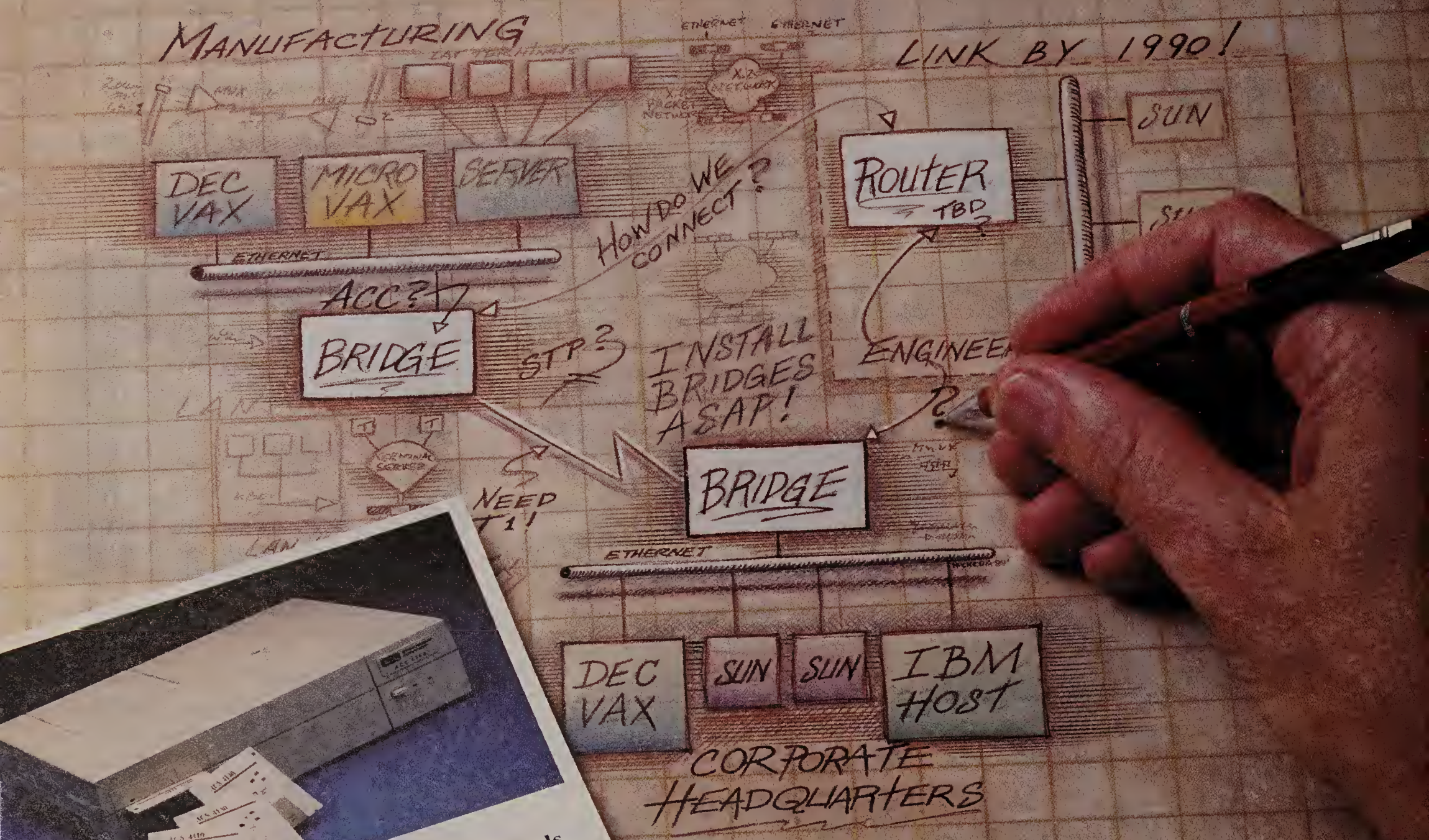

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See the FAXNeT Form on Page #59

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

"I think [Systems Center, Inc.'s bid to acquire Net/Master marketing rights from Cincom Systems, Inc.] is a plus for both companies and for users. Everybody will benefit, and it will keep IBM honest."

Bart Stuck
President
Business Strategies
Westport, Conn.

Data Packets

Network Equipment Technologies, Inc. recently announced that its Integrated Digital Network Exchange (IDNX) T-1 multiplexer has been determined compatible with the Integrated Services Digital Network Primary Rate Interface of **Northern Telecom, Inc.**'s Meridian SL-100 private branch exchange.

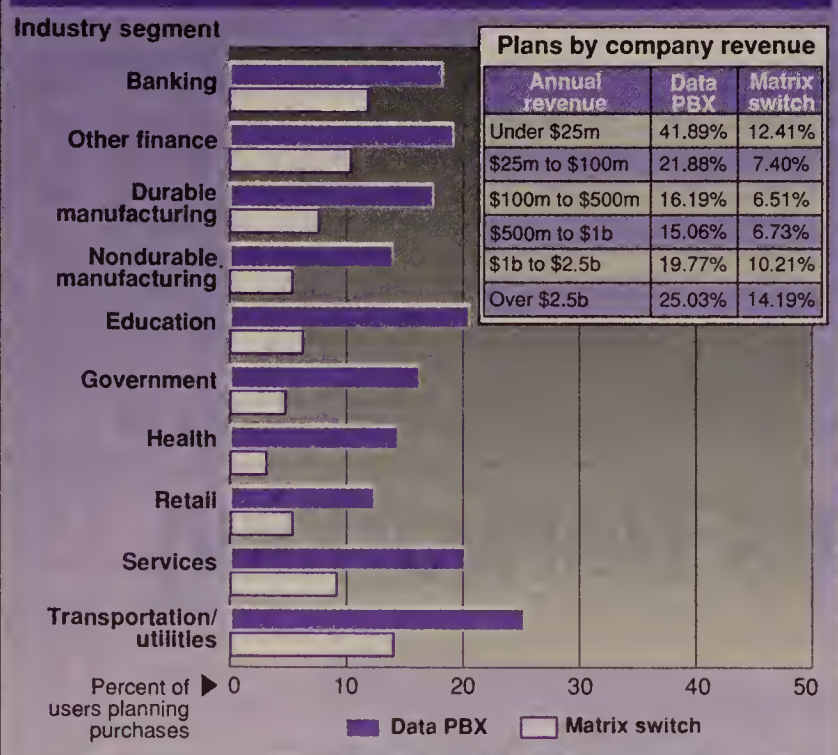
The compatibility tests were conducted at a Northern Telecom laboratory in Richardson, Texas. In early 1989, the Meridian SL-1 PBX was also deemed compatible with the IDNX.

Compatibility means the IDNX can transport across a digital network of SL-100s via the 23 64K bit/sec bearer channels and the 64K bit/sec signaling channel. This gives the user full 64K bit/sec DS0s that are not subject to signaling and density checks, which reduce usable bandwidth.

AT&T this week will announce the formation of a new business unit that will focus on development of network management products, including AT&T's Unified Network Management Architecture.

The Network Management Business Unit will be headed by William Gilbert, who will report to Joseph Nacchio, vice-president of marketing for AT&T's Business Communications Services group. Gilbert was previously responsible for net management in a business unit that was in charge of outbound services.

Data PBX/matrix switch purchase plans



Plans by company revenue

Annual revenue	Data PBX	Matrix switch
Under $25m	41.89%	12.41%
$25m to $100m	21.88%	7.40%
$100m to $500m	16.19%	6.51%
$500m to $1b	15.06%	6.73%
$1b to $2.5b	19.77%	10.21%
Over $2.5b	25.03%	14.19%

Large chart depicts purchase plans of 24,000 users by industry, inset chart shows respondents' purchase plans by company revenue.

SOURCE: *NETWORK WORLD*, INSTALLED TECHNOLOGY INTERNATIONAL, FRAMINGHAM, MASS.
GRAPHIC BY SUSAN SLATER

Compression Labs unveils its next-generation codecs

Line supports four video compression algorithms.

By Jim Brown
Senior Editor

SAN JOSE, Calif. — Compression Labs, Inc. (CLI) this week is planning to introduce Rembrandt II, the next generation of video coder/decoder (codec) in its videoconferencing line.

The Rembrandt II codec line is built around CLI's new Flex 5 architecture, which can support as many as four different video compression algorithms, including CLI's proprietary techniques and the emerging CCITT H.261 video compression standard. The Rembrandt II line will replace CLI's existing Rembrandt and Rembrandt 56 codecs, which each support a single video compression algorithm.

Codecs digitize analog video signals received from cameras and compress the digital data by replacing repetitive bit streams with shortened codes. Those codes are then transmitted over digital circuits to a receiving codec, which converts them back to the original bit stream. That bit stream is then converted back to analog video signals that are displayed on a monitor.

The first offering in CLI's new line, the Rembrandt II/06, supports transmission at user-selectable speeds from 56K to 384K bit/sec, enabling users to conduct videoconferences via leased 56K bit/sec digital data circuits, fractional T-1 circuits or on a 384K bit/sec portion of a T-1 line.

Those are the same speeds supported by its existing Rembrandt 56 codec.

CLI plans to introduce later this year a Rembrandt II codec supporting speeds from 384K bit/sec to 3.136M bit/sec, which is what the existing Rembrandt codec supports, said John Walsh, CLI's executive vice-president of sales and marketing.

The Rembrandt II/06 will initially support CLI's proprietary Cosign Transform Extended (CTX) algorithm, also being introduced this week, and CLI's Differential Transform Coding (DXC) compression algorithm, which is used in both the Rembrandt and Rembrandt 56 codecs.

CLI said the CTX compression algorithm will provide picture quality that is twice as good as the DXC algorithm. This will help make the Rembrandt II/06 codec more appealing to customers that want high-quality video images at lower speeds, Walsh said.

Future versions of the Rembrandt II/06 codec will support the CCITT's emerging H.261 standard, also known as P x 64. The CCITT standard, expected to be ratified this year, will enable video codecs from various manufacturers to communicate at between 64K bit/sec and the European T-1 rate of 2.048M bit/sec, in increments of 64K bit/sec.

Lastly, CLI will add to the Rembrandt II/06 support for the Cooperative of Science and Technology's 211 algorithm, which is an implementation of a proposed CCITT standard for videoconfer-

(continued on page 24)

Users see promise in Net/Master buyout

Customers say move could bring enhancements to market sooner, encourage third-party support.

By Paul Desmond
Senior Writer

RESTON, Va. — Users of Net/Master SNA net management software are optimistic that System Center, Inc.'s proposed acquisition of the product's developer and marketing rights will spell good news.

Users said that if Systems Center is successful in its bid to acquire Software Developments International Pty., Ltd. (SDI), which developed the software, and the marketing rights to Net/Master from Cincom Systems, Inc., it should speed availability of enhancements for the network management package.

Net/Master is the chief competitor to IBM's NetView for managing Systems Network Architecture networks. The product was developed by SDI, an Australian company, which sold the marketing and support rights for the product to Cincom in 1984. SDI retained product development rights.

The acquisitions should also quell concerns about a series of lawsuits that SDI and Cincom filed against each other beginning in June 1988 over interpretations of their agreement.

Some users and analysts assert that the legal battle has stalled the release of Net/Master enhancements and discouraged third-party support of Net/Master, although SDI denies those allegations.

Awaiting enhancements

Users contacted by *Network World* were clearly optimistic that the change will be for the better.

"If we have problems or special requests, they might get addressed sooner because [product development and marketing] will be under one umbrella," said Lori James, lead computer analyst for Dayton Power and Light Co. in Dayton, Ohio.

Users said having research and development under the auspices of a separate company from the

(continued on page 24)

Tyson Foods dumps hosts for local nets

By Jim Brown
Senior Editor

SPRINGDALE, Ark. — Tyson Foods, Inc. last week said it is replacing its nationwide hierarchical network with distributed local-area networks linked via bridges to the company's data center.

The company is making the move to provide more reliable network services to its remote sites without increasing operating costs.

"What we hope to be able to do is provide better services for essentially the same cost," said Paul Lothian, a staff analyst.

Tyson will replace a Unisys Corp. 1100 mainframe at its data center here with an Ethernet backbone initially supporting two Digital Equipment Corp. VAX 6420 minicomputers and attached terminals.

The installation of the DEC equipment is part of a three-year, $9.2 million contract with the vendor, under which Tyson will swap out Unisys equipment in favor of DEC products at all 80 of its poultry processing plants in 12 states and Quebec.

Tyson will install Ethernets supporting DEC MicroVAX 3100s in 14 of the plants, which also double as regional centers to administer contracts the company has with farmers who raise chickens. The MicroVAXes will replace Unisys U5000 minicomputers at these locations.

The sites will be linked via Vitalink Communications Corp. bridges over 56K bit/sec digital lines to the backbone Ethernet at headquarters.

The company will replace Unisys terminals at all 80 remote sites with DEC VT-320 terminals. Terminals in plants without a MicroVAX will be linked to a DECmux, a statistical multiplexer that will link as many as eight terminals over a 9.6K bit/sec leased line to an Ethernet-attached DEC MUXserver 100 in regional sites. The MicroVAXes at each regional site will support Ethernet-attached terminals.

Tyson will also be replacing many of the analog leased lines that currently link its remote sites to headquarters with digital facilities where available, thus making the network more reliable.

"We're in a lot of small isolated places where we can't get digital circuits," Lothian said.

Users see promise in Net/Master buyout

continued from page 23

marketing and support team has not been a major problem, although it may have caused delays in the turnaround time for user-requested enhancements.

Rich Krejsa, manager of systems programming at Dana Corp.'s Boston Industrial Products Division in Brentwood, Tenn., for example, said Net/Master Release 2.1 was available under controlled release in May 1989 for IBM's MVS operating system but it is not yet available for VSE users like himself.

"I'm not positive that has anything to do with the development being done in Australia. All I know is I'm still waiting," Krejsa said.

Analysts said Systems Center should be able to put more capital into Net/Master development than the cash-strapped Cincom could.

"They're suffering from a common problem, which is that you overextend yourself," said James Herman, a principal with Northeast Consulting Resources, Inc. in Boston. "You try to sell too many products, and you don't sell any of them well."

Users agreed with that assessment. "In my mind, knowing the superiority of the product [compared with NetView], they just haven't been aggressive enough in their marketing efforts," said a Net/Master user who requested anonymity.

Users said they don't anticipate any problems in support for the product because they expect the majority of Cincom employees who worked on Net/Master to jump ship to Systems Center if the deal is approved. That would include key Net/Master players such as Walter Thomas and Victoria Duckworth.

Last month, when the deal was announced, Robert Cook, Systems Center's chairman and chief executive officer, said Cincom employees were welcome.

Thomas Nies, Cincom's president and CEO, echoed those sentiments to Net/Master customers in a letter, which was obtained by *Network World*. If Cincom reaches an agreement with Systems Center, "that agreement would also include the assumption of those Cincom personnel whose responsibilities focus primarily upon the sales, marketing and support of Net/Master," the letter stated.

Users and analysts said the split between development and marketing made it difficult for other vendors to form alliances that would tie Net/Master to their net management systems.

Cincom succeeded in that effort with AT&T and produced a product that ties Net/Master to AT&T's Accumaster Integrator, but SDI was not involved in the deal.

The ongoing legal battle may have exacerbated that situation. One user who requested anonymity said it also stopped the flow of Net/Master enhancements from SDI to Cincom.

John Robinson, managing director of SDI and one of the three original Net/Master developers, vehemently denied that allegation. "Every part of Net/Master that was made generally available was made available to Cincom," he said.

Robinson declined to discuss the details of the court battle but said the litigation is dormant and will be resolved or dismissed soon. "It's going to disappear is the easiest way to put it," he said.

Robinson said SDI is working on a number of projects that would help give users a homogeneous presentation of and control over multivendor networks. He hinted that SDI would work to support Digital Equipment Corp.'s Enterprise Management Architecture, which would add to Net/Master's existing support for AT&T's Unified Network Management Architecture, a result of the AT&T/Cincom deal.

"Being in this business, we're very aware of what the customers are looking for and the sorts of [hardware] platforms they're using," Robinson said. "It hasn't escaped our notice that Digital is a major player there."

Compression Labs unveils codecs

continued from page 23

encing at 2.048M bit/sec.

The Rembrandt II/06 also employs a CLI-developed intercodec signaling technique that enables a Rembrandt II/06 to determine which compression algorithm other codecs support when a videoconference is being set up. This will enable the Rembrandt II/06 to automatically select the compression algorithm needed to establish communications between the two codecs.

CLI's Flex 5 architecture also enables the Rembrandt II/06 to support a greater number of network interface boards than CLI's existing codecs. The Rembrandt II/06 has 14 board slots, nine of which are used to support such things as processor boards and interface slots for cameras and audio equipment. The remaining slots can support a mix of network interface boards. Existing Rembrandt products support only a single network interface board.

Like CLI's existing codecs, the Rembrandt II/06 will also support interface boards that enable users to transmit data between microcomputers on the same line supporting transmission of video images.

Rembrandt II/06 codecs support transmission of up to four separate data channels in addition to the video channel. CLI's existing codecs support only two data channels plus the video channel.

The Rembrandt II/06 codec, scheduled for availability in the first quarter of 1990, will cost $31,500. It will include support for the CTX and DXC algorithms. CLI has an upgrade program that will enable users that purchased a Rembrandt 56 codec after October 1988 to trade it in, along with an additional $15,000, for a Rembrandt II/06.

See the FAXNeT Form on Page #59

Worth Noting

"In 1988, about 8,390 local network bridges were shipped. By 1992, local bridge shipments will increase to 24,587. That's a compound annual growth rate of about 40%."

Doug Gold
Communications research manager
International Data Corp.
Framingham, Mass.

Netnotes

Network Computing Devices, Inc. (NCD) of Mountain View, Calif., last week released software that enables its X/Window network display stations to communicate with hosts across serial lines.

The XRemote software is designed to handle multilevel data compression in X/Window environments. NCD wrote a special data compression protocol because existing compression techniques for alphanumeric data environments were not optimized to address the heavy bandwidth demands of bit-mapped workstations and windowing systems, the company said.

The software means that NCD's net display systems — terminals that off-load the processing of the X/Window graphical interface from the multiuser host — can be used not just where Ethernet connections are available, but at any site that has an ordinary telephone line or RS-232 link.

XRemote can be used to let X/Window end users in remote sales offices communicate with headquarters; it also allows software developers to do their work at home via telephone lines and modems.

The same X/Window terminal can have Ethernet and XRemote serial connections.

The XRemote software that runs on the display station is available in a programmable read-only memory set and is priced at $300 per NCD unit. The host portion of XRemote is available on a tape for $500 per host site.

TOPS to expand line, keep focus on easy-to-use LANs

Sun spins company off into independent unit.

By Walter Sweet
West Coast Correspondent

ALAMEDA, Calif. — John Porcaro, DOS products manager at The TOPS Division of Sun Microsystems, Inc., relishes digging through a stack of Novell, Inc. NetWare manuals before finding his prize: a manual to the manuals.

TOPS has built its reputation by offering inexpensive, easy-to-use and easy-to-install local-area network products.

The company plans to continue keeping its products simple, while at the same time broadening the platforms and environments it can support.

But industry analysts say they wonder if simplicity is the right path for TOPS in the new decade, suggesting that TOPS should move into higher end products while striving to avoid the need to print a manual for its manuals.

"They'd better, or they won't be around in the '90s," said Mike Heylin, an industry analyst with Creative Strategies Research International of Santa Clara, Calif. The issues of supporting different workstation operating systems and environments is very important, Heylin said, "but I'm very concerned about the holes in their product line, especially [regarding Microsoft] Windows and OS/2."

Heylin said the TOPS Windows product is not robust, and he pointed out that Apple Computer, Inc. has incorporated TOPS-like features into its soon to be released Macintosh OS 7.0.

The company, however, says its near-term goals are to enhance its product by extending its file-sharing, printer-sharing and messaging services to OS/2 environments and Microsoft Windows 3.0 by the end of 1990.

The company announced last week that it will incorporate its updated InBox electronic mail package, which enables Macintosh, DOS and OS/2 microcomputers to exchange E-mail and files, into its Macintosh and DOS product lines (see "TOPS merges file-sharing, E-mail into new

(continued on page 27)

LAN product lets PC users control remote micros

By Susan Breidenbach
West Coast Bureau Chief

ISELIN, N.J. — Triton Technologies, Inc. is scheduled to release a network gateway version of its Co/Session personal computer-to-personal computer remote control communications software at NetWorld 90 Boston next month.

Called Co/Session LAN, the product will let network users share modems to access and control a remote personal computer, establish terminal-emulation sessions with a remote host or transfer files.

Co/Session LAN is compatible with any communications server that supports either the IBM Interrupt 14 or the Network Asynchronous Server Interface/Network Communications Server Interface.

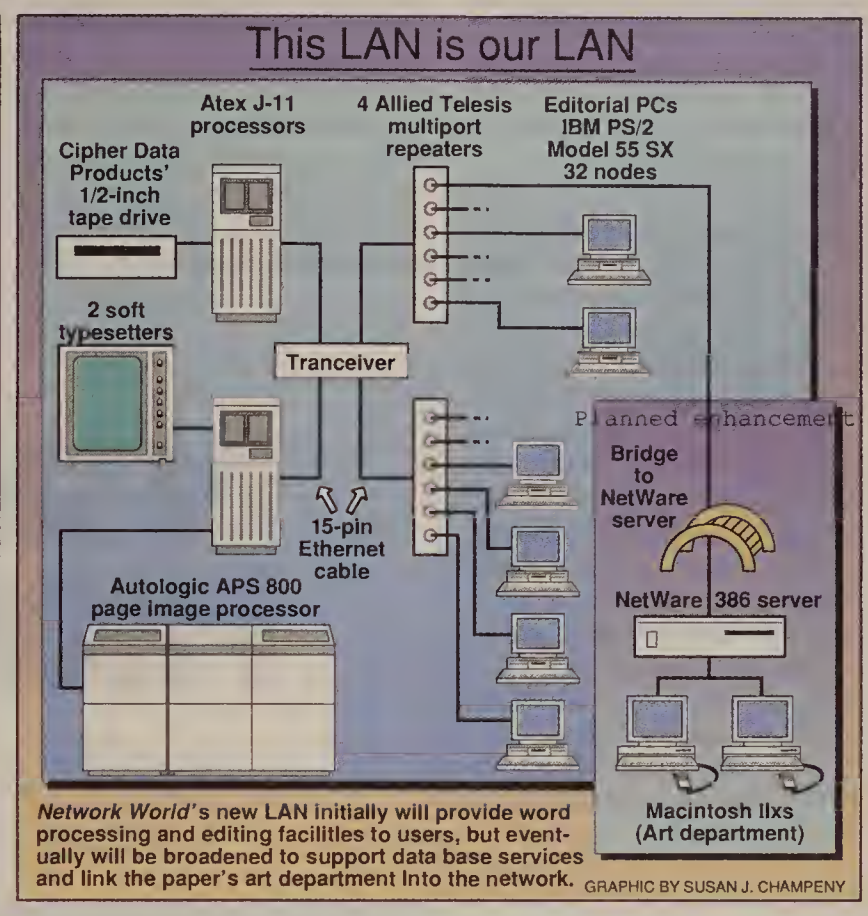
With Co/Session LAN, any workstation on the net can control or be controlled by any other workstation anywhere in the world via a dial-up telephone link. The workstation being controlled runs Co/Session LAN's Support program, which sends keystrokes to and receives screen images from the Co/Session Application program running on the controlling computer.

Companies can use the product, for example, to provide customers or users with technical support. If both sites have local-area networks, two Co/Session LANs can be used to establish a LAN-to-LAN bridge.

The Session/XL program includes a communications-scripting package that can be used for transferring files or for automatically polling remote personal computers at a certain time of day. Administrators can schedule certain tasks for unattended execution on remote or local personal computers, or for updating or downloading information from multiple locations.

For file transfers, the product supports both XModem and Triton's own proprietary 16-bit, full-duplex protocol. A terminal-emulation mode can be used to make connections with a variety of public bulletin board services.

Co/Session LAN is available in licenses that enable up to four users on the network to employ any of the program modules — Co/Session Application, Co/Session Support and Session/XL — simultaneously. A Co/Session LAN license costs $495.



Network World's new LAN initially will provide word processing and editing facilities to users, but eventually will be broadened to support data base services and link the paper's art department into the network. GRAPHIC BY SUSAN J. CHAMPENY

Network World LAN offers growth path

Relocation spurs migration from terminal/host system to one based on Ethernet, IBM PS/2s.

FRAMINGHAM, Mass. — *Network World* recently relocated its headquarters and successfully migrated its text processing system to a local-area network environment that will eventually enable us to embrace distributed computing.

The Atex Publishing Systems network is anchored by two minicomputers that support desktop IBM Personal System/2 microcomputers via a star-wired Ethernet. We are one of about eight companies — including The New York Times Co. and the American Medical Association — to install this type of Atex network.

Although the system initially supports only our editorial department, eventually the network will support our art, marketing and circulation departments.

On the editorial side, the long-term goal is to reach 100% electronic page generation, in which text, graphics, free-lance art and photographs are electronically integrated into a page that can be transmitted as a single file to our printer in Woodstock, Ill.

Such capabilities would be a quantum leap ahead of our existing page planning and layout capabilities. Although all text is created, edited and formatted electronically today, graphics are produced on Apple Computer, Inc. Macintosh computers and shipped via airmail to the printer, which manually adds the artwork and color photographs to the page.

The new network will give us greater control over the final product, reduce costs associated with graphics and extend deadlines to get last minute graphics, photographs and news into the paper.

The network setup

The Atex J-11 processors driving the network are based on Digital Equipment Corp. PDP-11 technology but incorporate many proprietary Atex components.

> The new net will give us greater control over the final and extend deadlines.
>
> ▲▲▲

Each processor is smaller than a two-drawer filing cabinet — or about one-quarter the size of the Atex processors they replaced — and each have 8M bytes of main memory and 300M bytes of disk capacity.

The J-11s support 32 users and mirror one another in the event either unit fails.

Each member of the editorial department has an Intel Corp. 80386-based IBM Personal System/2 Model 55 SX with 2M bytes of memory and a 30M-byte hard disk. The Personal System/2s are

(continued on page 26)

NW LAN offers growth path

continued from page 25

wired into the J-11s through four rack-mounted Allied Telesis, Inc. multiport Ethernet repeaters, which in turn are connected to a 16-port Allied Telesis CentreCom 1600 transceiver.

The repeaters are used to isolate collisions on the Ethernet to a single workstation wiring lead, according to Jeff Pennett and Jack McDonough, director and manager of information systems, respectively, at *Network World*.

To ensure uptime, Pennett and McDonough decided to link each Personal System/2 via thin-wire Ethernet cabling to a single port on the repeater, instead of daisy-chaining one workstation to another and sharing a single port.

"We built a number of fail-safe [devices] into the network," McDonough said. "This was one. If a PS/2 goes down, it only affects one user instead of bringing the network to its knees."

The hosts run text processing software from Atex, as well as SLOAD, a proprietary Atex network operating system that enables the J-11s to communicate with the Personal System/2s.

We built a number of fail-safe [devices] into the net. If a PS/2 goes down, it only affects one user instead of bringing the network to its knees.

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Both hosts also run PC Preference, an Atex program that supports the industry-standard Universal Datagram Protocol and Internet Protocols so the J-11s can share data with the Personal System/2s and perform session management. The Personal System/2s also run a PC Preference shell.

When editors turn their Personal System/2s on, the devices boot from the local hard drive and default to a menu that enables the user to log on to Atex or exit to PC-DOS.

When the Personal System/2s are logged onto Atex, they emulate the type of dumb terminals the company used with its earlier system. Eventually, however, Atex promises to migrate some of the actual processing done by the host to the end users' microcomputers in a client/server architecture.

Future plans

When the Atex software becomes available for the workstations, we will also be able to migrate from the J-11s to industry-standard network file servers, according to Brian Trombley, an Atex account executive.

Within the next several years, we plan to add a business application server, which will likely run Novell, Inc.'s NetWare 386, to provide a number of different user services.

The primary purpose of the NetWare LAN will be to connect Apple Macintosh IIx microcomputers in the art department to the Atex hosts, thus making it possible to merge text and art elements.

Our long-term vision is to archive all back issues on a relational data base server, allowing an editor to perform a search on a particular topic and pull up a list of stories in back issues.

The business application server would also support modem pooling and the ability for reporters to access the server from remote locations.

Since the NetWare 386 server would be supported as a subnetwork to the primary LAN, it will be linked to the Atex processors via a bridge attached to one of the repeaters.

Ultimately, Dianne Barrett, *Network World*'s art director, will be able to lay out a page on a screen, incorporate the art elements and pour the text around the images to compose the page. She could then ship the integrated text and graphics files over dial-up phone lines to the printer.

In the meantime, most of our pages are typeset locally on an Autologic Corp. APS 800 typesetter attached to the two hosts on the publishing LAN, enabling editors to obtain complete page printouts for proofreading without expending valuable time physically laying out the pages. The late-breaking news pages are currently composed electronically and transmitted to the printer.

TOPS to expand line, keep focus

continued from page 25

packages," page 33). "E-Mail. We really think that's the future of networking," Porcaro said.

Heylin is hot on InBox, particularly the price. A 100-user package will sell for $995. "But can a superior mail system really spearhead the leading reason to select one network over another?" Heylin asked.

Heylin and TOPS founder Nat Goldhaber, who is now a partner in a venture capital firm, say they believe TOPS has to compete in the market for higher end products, such as those offered by Novell, to remain competitive.

But Porcaro said, "We feel we're an alternative to Novell. There's no reason to be competitive as in the past. The pie is big enough that if we can each get a small piece, we'll all be successful." Heylin says he sees TOPS getting its piece of the low-end pie right now but wonders if there will be long-term demand in the low-end market.

"In the last two or three years, the market has matured and the requirements for networking have become much more mainstream," Heylin said. "Networks are no longer the premises of a single department. The market is more capable of handling high-end solutions."

Goldhaber said he thinks TOPS needs to take a couple of steps to increase visibility. "Namely, it has to pay attention to the fact that there is a need for a centralized data bank that requires the intercession of management," he said. "It means recognizing the importance of the file server."

TOPS traditionally has focused on peer-to-peer networking that does not require a dedicated server, and the company said it has no intention of going into the higher end market.

Goldhaber said TOPS should work with another company or develop a central file server on its own within three to five years.

"You have to believe that ease of use needs to be maintained," Goldhaber said. While maintaining the option of simple peer-to-peer networking, however, TOPS needs to add administrative tools that will provide for more sophisticated security and network management.

"I see no sign that other companies are making their product easy to use," Goldhaber added. "In order for TOPS to be the network that people buy and grow with, it will have to also provide the services that Novell is known for."

But analysts said last week's E-mail announcements won't be broad or deep enough to assure TOPS' success in the new decade. The announcement did, however, answer a few long-standing questions about TOPS' relationship with Sun. At the press briefing, it was announced that Sun has made TOPS an independent corporation with a separate board of directors that includes TOPS management, Sun executives and independent third parties.

It has been almost three years since Sun bought TOPS, and Sun's two primary plans for the acquisition have fizzled. While the merger has added to Sun's revenue and profitability, "I don't think Sun would have bought TOPS just to make money," Goldhaber said.

Sun wanted to use TOPS' dealer channel to market a low-end workstation line, a plan that has been postponed indefinitely. Sun also wanted to merge its Network File System (NFS) with TOPS' network operating system.

Sun had developed NFS for Unix and made it available to other system vendors inexpensively to establish it as the standard. "It was a brilliant move [that] catapulted them into the front and drove competitors out of the picture," Goldhaber said.

He said NFS and TOPS are conceptually very similar and it appeared the two could be merged. "It was a great idea, [but] it didn't work," Goldhaber said. The plan misfired because the two teams didn't work together in the same location, there was no established goal for the final product and NFS users wouldn't adopt a new system because they thought it didn't need to be changed, he explained.

After its primary merger goals sputtered, Sun decided to sell TOPS, according to Goldhaber. "There was talk of a management buyout, but it was decided that it was not acceptable for whatever reason," he said.

As an independent company, TOPS will be able to pursue its own destiny instead of having to live up to Sun's expectations.

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See the FAXNeT Form on Page #59

Worth Noting

"As we explored the question of outsourcing, we got nervous about handing over control of network management functions to an outside vendor. Network management is the whole brains of the network; you could be in big trouble if you manage it poorly."

DuWayne Peterson
Chief information officer
Merrill Lynch & Co., Inc.
New York

Association Watch

NetWorld 90 Boston, which will be held Feb. 12 to 15 in the Hynes Convention Center, has added four single-topic, all-day tutorial sessions to its slate of educational activities.

The tutorials are titled "Managing Network-Based Information Systems: A Strategic Framework," "Developing Network Applications," "Network Monitoring and Troubleshooting" and "Introduction to LANs and Topology."

Also, the **Affiliation of Network Users** will be coordinating 12 roundtable discussions during which network managers can discuss a variety of user problems with panels of industry experts.

The 90-minute roundtables will focus on 10 topics, including cable system design, local-area network management techniques and implementing wide-area nets.

Interested managers must preregister for tutorials and roundtables.

Admission to NetWorld 90 Boston's 175 exhibits costs $35 in advance and $50 on-site, while a full agenda of tutorials, roundtables and exhibits costs $375 in advance and $425 on-site. Other packages are available.

For more information, call (800) 444-3976.

CATT's telecom program offers users a real payback

Degree programs provide practical dividends.

By Joe Panepinto
Staff Writer

NEW YORK — For most companies, sending employees back to school is a calculated risk that involves weighing the cost of tuition against the promise of long-term payback.

But many companies, including Manufacturers Hanover Corp., Nynex Corp. and New York Telephone Co., have found that the Center for Advanced Technology in Telecommunications (CATT) at Polytechnic University of New York pays dividends.

These firms have found that executives who complete CATT's master of science in telecommunications management or master of science in information systems (IS) engineering degree programs convert personal gains into real-dollar returns.

In addition to gaining technical expertise through CATT's Network Design Laboratory and Center for Digital Systems, executives in both the IS engineering and telecommunications management programs spend their second year in the weekend degree programs working on projects pertinent to their work. The fruits of those projects often help offset the school's $25,000 tuition.

"I think we get more of a return" than we pay out, said Ellen McCambley, staff director of executive education at Nynex. "They go out as Nynex employees and come back with a better understanding of the technology and the world they are trying to serve."

Nynex and New York Telephone have extensive screening processes for executives seeking admission to the Polytechnic University program. Screening begins with an officer nomination and, for approximately 10 successful Nynex and New York Telephone executives per year, ends with a final warning about the rigors of the program.

"They have to understand that they have to go to school full time and work full time," McCambley said. "They are told they still are expected to work a 40-hour week."

(continued on page 30)

BOOK REVIEW

BY ERIC SCHMALL

Customer service lessons for network managers

Total Customer Service: The Ultimate Weapon, William Davidow and Bro Uttal (New York: Harper and Row, 1989), $19.95.

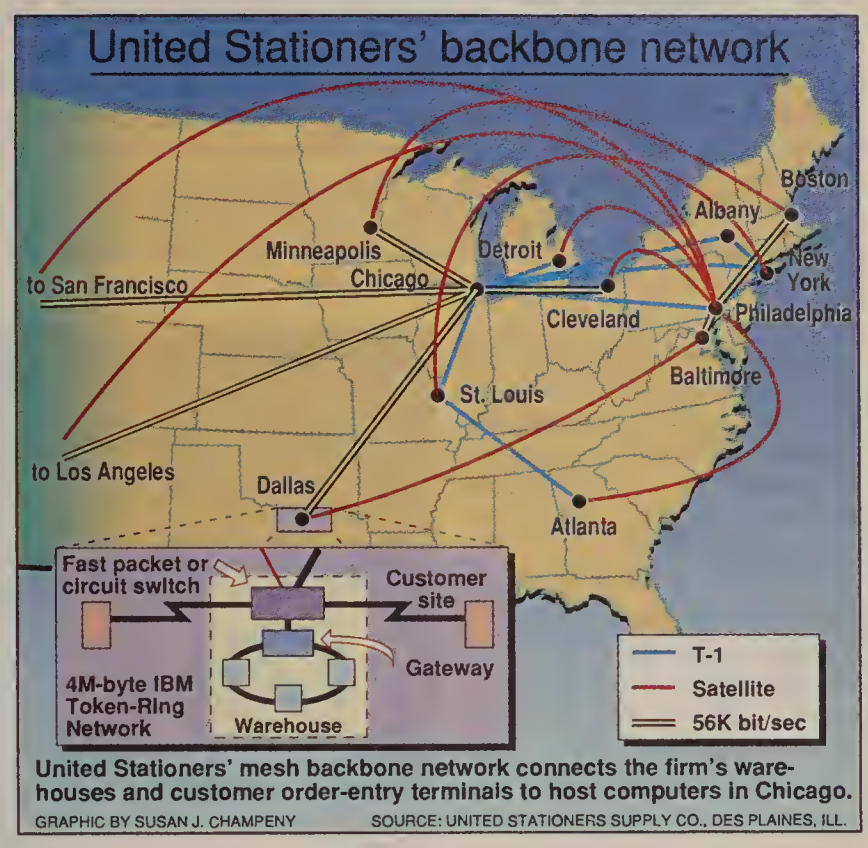
Total Customer Service: The Ultimate Weapon provides all managers with a thorough examination of how customer service can provide companies with a competitive advantage. The book outlines six principles of customer service, which, while not directly related to telecommunications, can help net managers better understand how to deploy communications resources to improve customer service:

- Assemble a clear customer service strategy that takes into consideration customer expectations and market trends.
- Make customer service an integral part of the company's mission and an important priority for all employees.
- Implement comprehensive customer service training programs to teach employees methods for improving customer service.
- Reevaluate design methods to ensure that products are easy to maintain and service. A better design process can identify and correct potential points of failure before products are manufactured.
- Build an efficient physical communications infrastructure that expedites the flow of information and enables companies to respond quickly to customer inquiries.
- Establish tools, such as customer surveys, that monitor customer satisfaction and suggest ways to improve service.

(continued on page 30)

Schmall is network systems manager for an insurance holding company.

MANAGEMENT PROFILE



United Stationers' mesh backbone network connects the firm's warehouses and customer order-entry terminals to host computers in Chicago.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: UNITED STATIONERS SUPPLY CO., DES PLAINES, ILL.

User bolsters net for strategic edge

By Wayne Eckerson
Senior Writer

DES PLAINES, Ill. — To stay ahead of the competition and keep pace with corporate growth, United Stationers Supply Co. is beefing up the capacity of its nationwide voice and data network.

The wholesaler of office supplies, based here, is upgrading its network so it can support a variety of new applications, such as electronic catalogs and bar coding, that are intended to improve customer service and enhance intracompany communications.

"Our goal is to provide enough bandwidth to users so they can [run any application] they want when they want," said Bernie Schneider, telecommunications director at United Stationers.

United Stationers is steadily adding users and customers to its backbone network. The company is adding about one warehouse a year to the net. In the next three years, it will double the number of customers using the net for electronic order entry from 1,500 to 3,000.

The advent of local networks and personal computers at distribution sites has increased demands on the backbone as well, Schneider said. Local-area net users increasingly want to transfer files across the backbone or access information on remote data bases in other distribution sites or at corporate headquarters here.

To accommodate this growth, United Stationers is installing T-1 circuits throughout its backbone network and is planning to implement T-3 circuits between some of its larger sites. The company is also converting low-speed analog tail circuits supporting customer order entry terminals to higher speed digital lines.

To get the most out of the backbone, the company has decided to standardize on StrataCom, Inc. Integrated Packet Exchange (IPX) T-1 multiplexers, which are based on fast-packet technology. These multiplexers, which have been installed in about half of the backbone hubs so far, have enabled United Stationers to merge voice and data over the backbone. Previously, the firm used AT&T WATS service to handle its voice traffic.

United Stationers has also begun using LANs to handle receiving, storage and shipment scheduling applications that previously ran on IBM 3090 mainframes in its central data center here. This not only off-loads traffic from the backbone but also provides end users with better tools to manage inventory and track the more than 25,000 office supply items the firm keeps in its distribution centers, Schneider said.

For example, when a shipment arrives at a warehouse, workers on the receiving dock use a personal computer to verify that the content of the shipment matches the purchase order.

The personal computer then prints out bar code labels, based on the purchase order information; the labels are then applied to the cartons. By scanning the bar codes, package handlers can tell what is in the cartons and where

(continued on page 30)

Hospitals experiment with PC-to-PC image transfers

By Wayne Eckerson
Senior Writer

ST. LOUIS — Cardinal Glennon Children's Hospital here is preparing to test personal computer-to-personal computer transmission of digitized medical images with another hospital using switched 56K bit/sec and Integrated Services Digital Network services.

If successful, the system may be a boon for small or rural hospitals that cannot attract specialists in radiology or afford the expensive mainframe- or minicomputer-based imaging systems currently on the market.

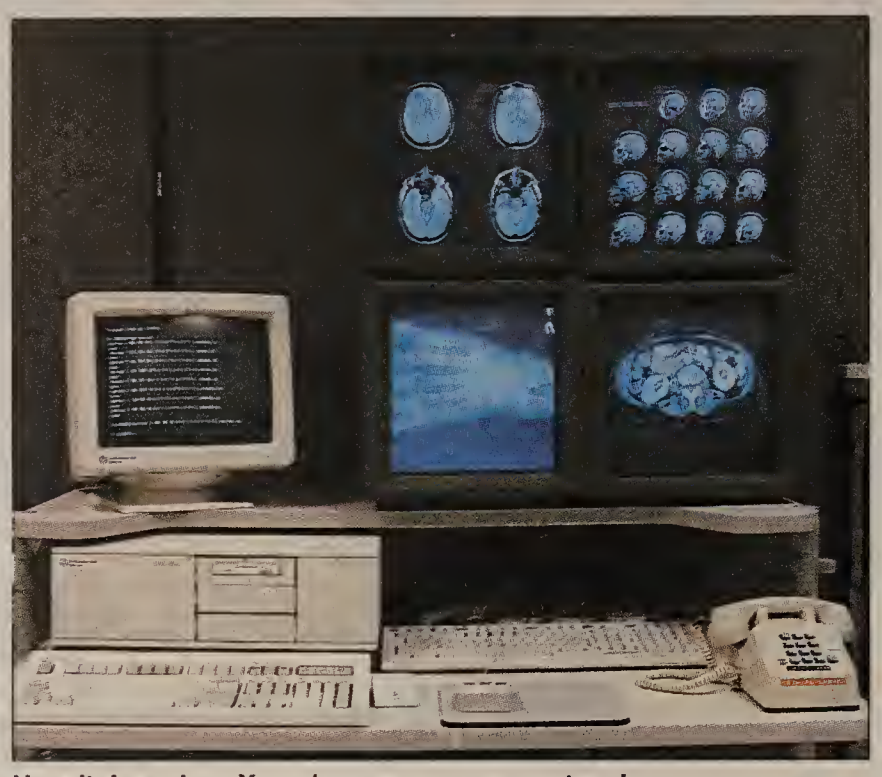
The network will let these hospitals use personal computers to transmit a wide range of medical images, such as X-rays, CAT scans, magnetic resonance images and medical records, to radiology experts at large urban or regional hospitals. The experts will diagnose the X-rays and consult with physicians at remote hospitals over the phone.

The hospital plans to transmit radiological images to the University of Texas Health Sciences Center at Houston via switched 56K bit/sec lines provided by Southwestern Bell Telephone Co. The Houston hospital will be linked to a nearby Southwestern Bell central office using ISDN Basic Rate Interface (BRI) lines.

Robert Trottmann, a health care analyst for Southwestern Bell, said the ISDN and switched 56K bit/sec services are being used in the trial because they are the most cost-effective means of transmitting the images.

Both hospitals are being supplied with computerized laser scanners, Intel Corp. 80386-based personal computers, high-resolution monitors and proprietary software by Medical Imaging Systems, Inc., a systems integrator specializing in health care applications. The personal computer-based software will create menus that will allow physicians to select and view the medical images. Southwestern Bell is coordinating the communications between the hospitals.

The laser scanners will convert X-ray film into digital images that can be transmitted immediately across the network or stored on the hard disk of a personal computer or a personal computer-attached optical or magnetic storage device.



Hospital receives X-ray images over new network.

In the six-month trial, the hospitals will transmit X-ray images from old patient files. Radiologists at each hospital will review the transmitted images and submit a diagnosis, just as they would in actual patient cases. Several weeks later, they will make another diagnosis using the original X-ray. The hospitals will then compare the results to see if the transmitted images altered the physicians' diagnoses.

The trial will also determine the optimal speed at which images can be transmitted without sacrificing image quality, Trottmann said. Currently, as part of the trial, two hospitals affiliated with the University of Texas Health Sciences Center are passing medical images across a 64K bit/sec ISDN BRI channel. It takes the hospitals 2½ minutes to transmit a full-sized 11- by 17-in. uncompressed X-ray image between sites, Trottmann said.

Eventually, this time could be whittled down to about 30 seconds without degrading the clarity of the images, Trottmann said. This will be done by transmitting images across two 64K bit/sec B channels (instead of one B channel) and using 2-to-1 data compression. Trottmann said the hospitals will store the images on the personal computers' 80M-byte hard drives during the trial, but hospitals will be able to use other storage devices, such as optical and magnetic disks, with the systems in the future.

However, Trottmann said the health care industry is still waiting for a storage device large enough to hold the thousands of images hospitals need to access on a daily basis. "Those systems, when they arrive, will be defined by terabytes of capacity, not gigabytes," Trottmann said.

User bolsters net for strategic edge

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to put them in the warehouse.

United Stationers' backbone network consists of multiple T-1, AT&T 56K Dataphone Digital Service and 56K bit/sec satellite links between 15 regional distribution sites.

The satellite facilities are used primarily to back up the T-1 and 56K bit/sec circuits (see graphic, page 29).

Today, each distribution site serves as a network hub and is outfitted with either a StrataCom IPX T-1 multiplexer or an Infotron Systems Corp. 990 statistical multiplexer. Each multiplexer supports two or more T-1 or 56K bit/sec links to other network hubs, making it possible to automatically reroute traffic around downed links.

Distribution centers are outfitted with IBM 4M bit/sec Token-Ring Networks, which are tied to the backbone via CrossComm Corp. ILan bridges.

Besides using the personal computers to run applications for receiving, scheduling and storage functions, the personal computers also emulate IBM 3270 terminals, enabling users to access host applications on IBM 3090 mainframes in United Stationers' central data center. The mainframes run applications such as accounts payable, accounts receivable, payroll and order processing.

Each distribution site also serves as the hub for numerous 4.8K or 9.6K bit/sec analog tail circuits that connect electronic order entry terminals at customer sites in the region.

Upgrading these tail circuits to 56K or 64K bit/sec digital circuits will enable United Stationers to support additional customers as well as a variety of bandwidth-intensive applications and services.

For example, United Stationers wants to offer customers an electronic catalog service to replace the thick paper manuals customers now use to look up merchandise they want to order. This would provide customers with more accurate and timely information about United Stationers' products.

This application, among others, is needed to keep the company competitive with other office suppliers that offer customers proprietary order entry systems, Schneider said.

Service lessons for net managers

continued from page 29

The authors do not present these principles as simple cookbook ideas. They stress that using customer service as a competitive weapon requires companies to make a significant commitment in time and money and make drastic changes in existing company procedures.

Even the most prosperous and progressive organizations, the authors say, may blanch at the challenges in creating an effective customer service program.

Despite the challenges, there are many opportunities for network managers to help companies improve customer service.

For instance, network managers can establish an 800 number that lets customers call into a help desk. This provides customers with a quick and convenient way to help diagnose problems. Also, network managers might set up phone lines that would allow technicians to diagnose problems in customer equipment remotely. This could let companies detect and correct problems before the customer knows about them.

Companies might also install cellular phones in a fleet of repair vehicles. This would enable companies to dispatch technicians quickly to customer sites when there is a problem.

Although the book is peppered with references to a variety of studies, interviews and other published sources, the authors use a simple and entertaining writing style. Overall, the book is an easy-to-read, informative guide that can help network managers become more effective contributors to their company's customer service programs.

CATT's program offers payback

continued from page 29

The 70 executives ultimately accepted by the school each fall go through the two-year program in study groups made up of executives from end-user, vendor and carrier companies. The mixed-industry study groups give executives insights into the role of their companies within and across markets.

Ed Palmer, associate director of network planning at Nynex in White Plains, N.Y., graduated from Polytechnic University's telecommunications management program in 1988 and focused his second-year project on the emergence of high-speed data transmission and the impact of T-1 service on Nynex's international competitiveness.

"What the program did was give more of a corporate and strategic perspective," Palmer said. "And it was with that perspective that I was able to see more directly how planning was necessary in the industry."

Other executives use the second-year project to catch up on technical advances and to experiment with emerging technologies.

Ariel Kornberg, a senior technical officer at Manufacturers Hanover and a 1989 graduate from the IS engineering program, did a queuing systems analysis of his company's VAX-based Broker-Dealer Automation System. The study enabled Kornberg to measure the performance of the system in real time.

"The second-year project was an open invitation to join something that had academic weight with something that would contribute to our companies," Kornberg said. "It really actualized that marriage between what we were learning and what we were doing at work."

Classes in Polytechnic University's four-semester program run all day Friday and Saturday, every other week, from September through May. Besides picking up the tab, companies that send executives have to be willing to work around their new schedules.

"What impressed me was [Nynex's] investment in people to grow," Palmer said. "Even if you are married with children and have the realities of home pressing on you, the program is in a context that is doable."

Many universities around the country offer executive education programs, but few offer accredited master of science degree programs geared exclusively toward the full-time executive.

> "It actualized the marriage between what we were learning and what we did at work."
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National University in San Diego offers an MBA degree with an emphasis in telecommunications, but classes are scattered throughout the workday and are not convenient for executives.

The University of Southern California School of Business Administration offers a two-week advanced management program in telecommunications, but it only provides a certificate of advanced study. The Michigan Business School at the University of Michigan offers management seminars and executive development programs aimed at managing technology; however, none are as comprehensive as the programs at Polytechnic University.

"What companies are looking for specifically is to get people with more capabilities," said Ivan Frisch, director of CATT. "They promote people who go through the program more quickly and get more from them."

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

"T-1 circuits in Canada are far too expensive. They cost the same as buying 21 or 22 [dedicated] voice-grade channels, which means that no one can afford them unless they're looking for enhanced services like Group IV fax or other applications that require large bandwidth."

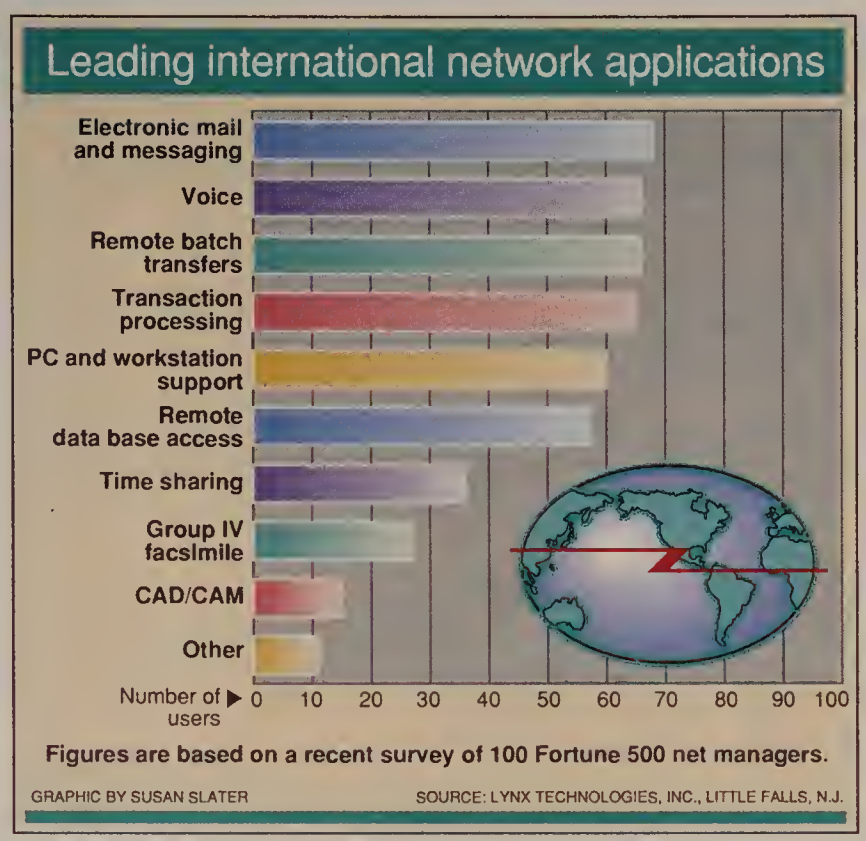
Brian Callihoo
President
Canadian Business
Telecommunications Alliance
Toronto

World News

US Sprint Communications Co. last week announced that it has signed an agreement to interconnect its network with Mexico's national carrier, **Telefonos de Mexico, S.A. de C.V. (TelMex),** and that it plans to begin offering international 800 and private-line services in the country by the end of 1991.

US Sprint joins AT&T and MCI Communications Corp., which also recently said they will offer advanced network services in Mexico. US Sprint will connect its network with TelMex's via fiber-optic facilities at four locations along the U.S./Mexican border. These border crossings will allow US Sprint to provide switched long-distance service into Mexico without leasing AT&T facilities. AT&T is the only U.S. carrier that has physical connections to the TelMex net.

El Segundo, Calif-based **Hughes Aircraft Co.** recently received government approval to ship the **AsiaSat1** satellite to Asia Satellite Telecommunications Co., Ltd. The Hong Kong consortium plans to launch the satellite this spring and use it to provide advanced network services to the People's Republic of China.



Alternative net provider emerges in West Germany

Rates for private-line services set precedent.

By Barton Crockett
Senior Editor

COLOGNE, West Germany — Meganet GmbH, based here, may be an attractive option for U.S. users shopping for network services in this country.

Meganet, West Germany's only alternative supplier of private-line services, charges rates for 9.6K, 19.2K and 64K bit/sec circuits that are guaranteed to be lower than what national carrier Deutsche Bundespost charges for 9.6K bit/sec circuits between the same sites.

Meganet operates a private network interconnecting 17 West German cities that is based on 64K bit/sec circuits leased from Deutsche Bundespost at volume-discounted rates.

"We're a good alternative for American companies with operations over here," said Meganet's president, Erwin Schaefer.

Meganet is able to provide service because of a September 1988 decision by the West German government that loosened restrictions on competition in data communications services.

Previously, competition was constrained by regulations requiring that at least half the capacity on dedicated circuits be used to support a company's internal network traffic.

Because of this limitation, Schaefer said only a handful of companies with large West German operations, such as IBM and Siemens AG, were able to provide network services in competition with Deutsche Bundespost. And these companies only supplied X.25 packet-switching services.

Schaefer said that without the rule change, Meganet, which was founded in August 1988, could not have gotten into the leased-line services business. "It would not have been feasible," he said.

Meganet is owned by three West German insurance companies as well as West Germany's international carrier. Each firm owns a 25% stake.

Schaefer said Meganet began supplying network services to the three insurance companies in December 1988. By the spring of 1989, Meganet had begun selling dedicated 9.6K, 19.2K and 64K bit/sec circuits to other users.

According to Schaefer, Meganet now has about 30 customers. He expects 1990 revenues to total about $4.8 million, with the company becoming profitable in May. Meganet's 1989 revenues totaled about $2.4 million, and Schaefer said Meganet is growing at a rate of about 20% per month.

Schaefer explained that Meganet appeals to users because it charges the same flat rate for dedicated 9.6K, 19.2K and 64K bit/sec circuits — and the rate is always lower than Deutsche Bundespost rates for dedicated 9.6K circuits between the same points.

"If the Deutsche Bundespost charges 5,000 DM per month [about $3,000] for a 9.6K bit/sec circuit between Cologne and Munich [West Germany], we'll charge 4,000 DM [about $2,400] for the same circuit at either 9.6K, 19.2K or 64K bit/sec."

Schaefer said users have not flocked to the 64K bit/sec circuits because of the extra equipment cost involved. "Most [West German] companies don't have 64K

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Private-line prices to plunge in Canada

Country's largest carriers attempt to bring cost of dedicated facilities in line with prices in U.S.

By Barton Crockett
Senior Editor

OTTAWA — Canada's major carriers are planning to cut prices for high-speed private lines by as much as 70%, bringing the cost of dedicated facilities in this country closer to rates charged in the U.S.

Telecom Canada, an association based here representing most of Canada's regional carriers, said that by early this year, its members plan to cut rates for Dataroute 56K bit/sec circuits as much as 70%, while rates for Megaplan T-1 circuits will drop an average of 50%. Rates for Megastream dedicated 64K bit/sec circuits will drop up to 20%.

The carriers also plan to begin offering fractional T-1 service and to drop a requirement forcing Megastream users to buy a minimum of four 64K bit/sec circuits.

For example, one of Telecom Canada's largest carriers, Burnaby, British Columbia-based British Columbia Telephone Co., expects that rates for a T-1 circuit between Vancouver and Toronto, about 2,000 miles away in Bell Canada's service area, could drop 57% to about $36,500 per month. The cost of a 64K bit/sec circuit for the same route could decline roughly 33%, to approximately $3,000 per month, according to Robert Simons, group product manager for integrated networks at the carrier.

Simons said these prices do not include local access charges, which will be largely unaffected by the rate changes. He said rates will drop most for longer circuits, noting that the cost of a 43-mile T-1 link between Vancouver and British Columbia's capital, Victoria, for example, will probably drop about 45% to roughly $9,000 per month, while rates for dedicated 64K bit/sec circuits on the same span would drop only about 12%, to approximately $750 per month.

Simons said British Columbia Telephone is cutting rates in order to pass along savings from technological advances in its network.

Revolutionary

Users hailed the rate reductions, saying they will make it easier for U.S. users to extend high-speed digital facilities into Canada.

(continued on page 32)

Customer response tepid to MCI financial service

WASHINGTON, D.C. — Despite the potential it offers for savings, an MCI Communications Corp. service that translates telexed requests for money transfers into a standard format and sends them to a bank's computers, has met with little success.

To date, only two customers have signed up for MCI's Automated Money Transfer System, (AMTS), which was introduced in 1988. Customers who have been approached about the service by MCI have expressed little interest in it.

The service is designed to help international banks cope with the flood of telexes that many financial institutions around the world use to initiate funds transfers. MCI receives telexes sent in any English format and converts them into an International Standards Organization (ISO)-compliant form. Messages are then forwarded over dedicated links to a bank's computer systems.

"It really speeds up the process," said Ashim Das, an MCI advisory engineer who has worked to implement AMTS.

An MCI executive familiar with the offering said the carrier will supply AMTS services at no cost to banks with large international operations. He said the carrier targets banks for which the cost of supplying AMTS service would be more than offset by revenue gains from an increase in telex traffic over the MCI network.

Under AMTS, a bank directs its business partners to route telex traffic to an MCI telex number.

Messages are then sent from an MCI telex machine over an Ethernet to IBM Personal Computers that act as front ends to Digital Equipment Corp. minicomputers. These run software for MCI's Store and Forward Exchange service, through which facsimile, telexes and electronic mail are stored and forwarded to users.

The DEC minicomputer identi-

(continued on page 32)

Private-line prices to plunge in Canada

continued from page 31

"This will make T-1 and private-line services feasible for many users that couldn't afford them before," said Brian Callihoo, president of the Toronto-based Canadian Business Telecommunications Alliance and manager of telecommunications at the London, Ontario, brewer John Labatt, Ltd.

Callihoo said dedicated lines in Canada are currently three to seven times more expensive than similar facilities in the U.S. He said carriers are reducing prices to prepare for an expected effort by Toronto-based alternative carrier CNCP Telecommunications this year to enter the switched long-distance service market.

Currently, CNCP is only allowed to sell private-line services. Callihoo said he believes CNCP will apply sometime this year for regulatory approval to sell switched services as well. He said he thinks the Telecom Canada carriers are cutting rates so regulators will look on them more favorably and it will be less likely that the CNCP petition will be approved.

"It's a shrewd political move," he said.

T-3 services to bow

Callihoo said users are also pleased with a recent decision by the Canadian Radio-Television and Telecommunications Council (CRTC) that requires the country's largest carriers to file tariffs for generally available T-3 services by Feb. 12.

Currently, T-3 services are not available to users in the country. In 1988 and 1989, however, the CRTC received petitions from Bell Canada and CNCP to supply T-3 lines to Toronto-based Teleglobe Canada, the country's international carrier, at specially tariffed rates that would not be available to users at large.

The CRTC denied this request and ordered the petitioning carriers and British Columbia Telephone to make T-3 services generally available instead. British Columbia Telephone's Simons said his company plans to make T-3s available first in metropolitan areas where demand is greatest and to make a single T-3 cost about as much as 4½ T-1s. Given the rate cuts expected in T-1 services, Callihoo said this would make T-3s attractive to many users.

"Without the rate cuts, no one could afford them," he said. "Nobody could even afford a T-1."

Alternative emerges in West Germany

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bit/sec equipment because 64K bit/sec circuits from the Deutsche Bundespost are too expensive to have," he said.

Over the course of the year, Meganet plans to increase its network capacity by installing 2.048M bit/sec European T-1 circuits between major network nodes and to extend its network to include about 30 West German cities.

Schaefer said Meganet also plans to build a separate X.25 packet-switching network with local-access nodes in about 60 to 70 West German cities and to begin providing packet-switching services in the country. He added that this year, Meganet plans to start offering enhanced services over its leased-line and packet-switching networks, including electronic mail, voice mail and facsimile transmissions.

Schaefer said Meganet also plans this year to extend network services into such countries as the U.S., the U.K. and The Netherlands by acquiring dedicated high-capacity international circuits. To date, Meganet has no U.S. users, but Schaefer predicts that will change in 1990.

Customer response tepid to MCI service

continued from page 31

fies telexes destined for customers subscribing to AMTS. It passes them off to a Symbolics, Inc. processor that uses expert systems software to sort text messages from requests for money transfers and to reformat them into ISO form.

Das said MCI guarantees that at least 90% of the funds transfers will be successfully separated from text messages and that 50% of these transfers will be converted into ISO forms with no problems.

While AMTS holds promise, a source familiar with the service who asked not to be named said that only a few banks have enough traffic to make it cost-effective for the carrier to offer them the service.

Jerry Appleby, a vice-president of telecommunications at Los Angeles-based Security Pacific Automation Co., which has discussed subscribing to AMTS with MCI, said the service probably wouldn't help his bank much. "We're happy with what we have now and don't see that we would gain much by changing," he said.

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Utility pack helps run NetWare LANs

ETI Software, Inc. recently introduced a management utilities program for Novell, Inc. NetWare users.

The software, **NetCompanion,** runs on a NetWare server and comprises 16 separate utilities for functions such as user management, performance monitoring, file management, workstation configuration, queue monitoring and server management and security.

NetCompanion provides diagnostic information about nodes on the network — such as number of packets received and sent and number of packets received and sent with errors — and information about the server to which the node is connected.

It can also gather statistics on network traffic to and from any given node at the Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), local net driver and shell level.

File server information, such as amount of free disk space, number of packets sent to nodes and file server utilization rate, is recorded and displayed as a series of bar graphs that enable users to identify potential problems quickly.

Net administrators can control the NetWare server from the command line of a workstation, deactivating the server or disconnecting users from it. They can also isolate network problems to a single workstation.

NetCompanion is scheduled for availability Jan. 22 and is priced at $349 per server. It runs on networks with NetWare Version 2.1 and above.

ETI Software, Inc., 2930 Prospect Ave., Cleveland, Ohio 44115; (800) 336-2014.

Racal InterLan adds drivers to E-net card

Racal InterLan, Inc. has enhanced its NI9210 adapter, a 16-bit Ethernet controller, with drivers that support Sun Microsystems, Inc.'s Network File System (NFS).

The NI9210 is being bundled with NFS drivers, which will let IBM Micro Channel Personal System/2s communicate in Ethernets using NFS.

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Codex EtherSpan vs. the market

Vendors	Ethernet bridge	Fractional T-1 support	Remote site support	Filtering/ forwarding rates (packets/sec)	Price
Codex Corp.	6310 EtherSpan Bridge	Yes	Up to 24	15,000/4,000	$11,985
CrossComm Corp.	ILAN	Yes	4	14,500/2,800	$9,600
Cryptall Communications Corp.	3000 Series	Yes	1	14,900/7,300	$7,500
Digital Equipment Corp.*	TransLAN III TransLAN 350	No No	8 8	14,800/2,000 14,800/5,000	$15,770**; $24,040 for 1 T-1 line
Ungermann-Bass, Inc.	Access/One Remote Ethernet Bridge	Yes	10	9,000/2,600	$6,500
Vitalink Communications Corp.	TransLAN III TransLAN 320 TransLAN 350	Yes Yes Yes	8 2 8	15,000/2,000 15,000/500 15,000/5,000	$14,250 $7,750 $18,750
Wellfleet Communications, Inc.	Feeder Node	Yes	2	14,000/ 14,000	$8,995

*DEC is a reseller of Vitalink products.
**Denotes base configuration.

Pricing and other information supplied by vendors as of Jan. 8, 1990.

GRAPHIC BY SUSAN SLATER

Support for 24 remote sites differentiates Codex bridge

Analysts praise E-net box's 'innovative' design.

By Tom Smith
New Products Editor

CANTON, Mass. — Codex Corp.'s recent entry into the local-area network internetworking market with an innovative Ethernet bridge is gaining praise from analysts who say the device compares favorably against existing bridges.

The 6310 EtherSpan Bridge is described by the vendor as a multiplexing bridge because it supports the T-1 D4 framing format, which divides an incoming T-1 line into 24 64K bit/sec channels. This enables users to employ any number of those channels to meet their needs ("Codex LAN group unveils high-speed Ethernet bridge," *NW,* Dec. 11, 1989).

ANALYSIS

This feature permits the 6310 to work with fractional T-1 services. It also lets the 6310 support links with as many as 24 remote sites when tied to an intelligent T-1 multiplexer or carrier-based services that use central office digital access and cross-connect systems for switching.

Although other Ethernet bridge suppliers support fractional T-1 (see graphic, this page), those vendors' products do not support connections to 24 remote sites on a single T-1 bridge.

"You may not need the entire bandwidth of a T-1 line devoted to your bridge," explained Brad Baldwin, industry analyst at Dataquest, Inc., a San Jose, Calif.-based consultancy. "Maybe you want to take a piece of that and devote it to different communications lines."

Codex's support for such an approach is "very innovative and quite a step forward," Baldwin added. "A lot of bridges on the market now have full T-1 capability; but if you want to use a T-1 and divide it up, there doesn't seem to be any way to do that."

Mark Leary, director of communications research at International Data Corp., a Framingham, Mass.-based consultancy, called fractional T-1 support the 6310's most significant feature.

"This DS0 orientation comes from Codex's [wide-area network] experience with multiplexing techniques," Leary said in a recent report, "Codex enters LAN internetworking market."

In introducing its product, Codex also said the 6310, unlike other bridges, is able to support from one to 24 64K bit/sec channels without adding extra V.35 ports to an existing bridge or adding more bridges. Other vendors' bridges, by contrast, require users to buy either additional V.35 cards for their bridges or additional bridges to increase capacity. Many bridges support a maximum of eight V.35 ports, which are used for sub-T-1 speeds.

Users must then pay extra for hardware, according to Codex, and they might have to use more ports on a T-1 multiplexer.

Instead, with the 6310, users could utilize separate DS0s at different sites either over the public network or through T-1 multiplexers onto a private network, according to Kenneth Miller, gen-

(continued on page 34)

SYSM bolsters E-mail for IBM mainframes

Update supports nicknames, message sorting; early user, sold on SYSM, switches from PROFS.

By Tom Smith
New Products Editor

BOISE, Idaho — H&W Computer Systems, Inc. recently enhanced its IBM mainframe-based electronic mail package, adding support for user nicknames and upgrading message sorting capabilities.

SYSM software runs on OS-, MVS/XA- or DOS/VSE-based IBM mainframes under CICS, enabling IBM terminal and Personal Computer users to exchange messages. The product is similar in function to IBM's Professional Office System (PROFS), which runs on VM-based mainframes.

The price, performance and flexibility offered by SYSM Release 6.3, the latest version, prompted Detroit Osteopathic Hospital Corp., a Southfield, Mich., holding company for three hospitals that previously used PROFS, to switch to SYSM about six months ago.

SYSM software's basic functions, in addition to sending and receiving E-mail, include in and out baskets; word processing and editing capabilities for composing messages; and calendaring/scheduling for users to maintain on-line information about their activities. Previous releases of the product offered interfaces to a variety of programs and devices, including PROFS and facsimile machines. The firm also offers a Soft-Switch, Inc. interface that supports X.400 and other public and private E-mail services, including MCI Communications Corp.'s MCI Mail and Telenet Communications Corp.'s Telenet.

Users can assign names to frequent mail recipients without having to input addresses.

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One of the key upgrades to the E-mail pack, according to Carol Peterson, marketing manager at H&W Computer Systems, is the introduction of nicknames. Previously, users had to address messages to user identification names, which became difficult when the number of users increased and IDs grew in complexity.

Now users can assign simple names to frequent mail recipients without having to remember or

(continued on page 34)

TOPS folds E-mail support into file-sharing software

By Walter Sweet
West Coast Correspondent

SANTA CLARA, Calif. — The TOPS Division of Sun Microsystems, Inc. last week introduced a version of its TOPS file-sharing software that includes integrated electronic mail.

The Network Bundle for DOS and the Network Bundle for Macintosh products combine the latest release of the TOPS/Macintosh 3.0 and TOPS/DOS 3.0 file-sharing packages with a new version of the company's InBox E-mail system. Previously, users had to purchase each package separately and integrate them.

According to Rich Shapero, vice-president and general manager of TOPS, the company bundled the software because large network users want an integrated package with services for an entire organization.

TOPS/Macintosh 3.0 now supports a shared environment extension in the Apple Filing Protocol (AFP), enabling the file-sharing software to support all AFP applications. It also supports the AppleTalk limit of up to 254 servers per network.

TOPS/Macintosh 3.0 also sports a more comprehensive set of file translators (licensed from Data Viz, Inc.) than previously available in other releases, Shapero said.

The print spooler has been enhanced to support AppleTalk 6.0, enabling it to drive Apple LaserWriter printers.

TOPS/DOS 3.0 incorporates DOS extender technology to reduce the amount of standard DOS memory it requires. It takes up as

(continued on page 34)

Star hubs squeeze seven devices onto IBM mini port

By Tom Smith
New Products Editor

SANDWICH, Mass. — Network Devices, Inc. recently introduced active and passive star hubs that allow up to seven terminals and other devices to share a single port on an IBM minicomputer.

The PowerStar and Link Star each come with at least one port supporting connection to an IBM Application System/400 or System 3X minicomputer, as well as ports for IBM terminals, printers and Personal Computers emulating terminals. The hub's host port supports the 1M bit/sec data rate of attached IBM minicomputers.

The PowerStar hub, like any active hub, amplifies the host computer's incoming signal. Boosting the signal enables the hub to support devices up to 4,500 feet away using IBM Type 3 unshielded twisted-pair cabling.

The PowerStar hub has an input power LED, as well as one LED for each port to indicate whether that port is able to receive data. The hub comes in single- and dual-host port models. A single-host model supports seven devices, and the dual-host port model supports 14 devices.

Boosting the signal enables the PowerStar hub to support devices up to 4,500 feet away.

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Star-wired active hubs offer an advantage over twinaxial daisy-chained configurations by providing fault-tolerance, according to Peggy DiMauro, sales manager for Network Devices. When a single device on the star goes down, the other devices can remain active. By contrast, in a daisy chain, failure of one device causes every device to go down.

Network Devices' passive Link Star hub simply retransmits the incoming host computer signal without amplifying it. For this reason, the maximum distance on any leg of the star will be 200 to 300 feet, depending on system configuration and electronics, DiMauro explained.

The passive hubs are available in versions supporting four and eight host ports. Like the active hub, they have RJ-45S modular jacks that support both RJ-11 and RJ-45 connectors.

Both new hubs from Network Devices are available now.

The active PowerStar is priced at $400 for a single host port and $860 for two host ports. The passive Link Star hub costs $350 for the four-port version and $500 for the eight-port version.

Network Devices can be reached in writing at P.O. Box 1419, 8-11 Jan Sebastian Way, Sandwich, Mass. 02563, or by calling (508) 888-5200.

Support differentiates bridge

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eral manager of Codex's LAN internetworking group.

This functionality is particularly relevant for users that bridge Ethernets over lines running at lower speeds than T-1.

"A lot of people run sub-T-1 rates using digital services at 9.6K, 19.2K and 56K bit/sec," Leary said. "Frequently, in other configurations, you have to use separate cards for each one of those lines that you bring into your bridge."

In two other categories, filtering and forwarding rates, Codex's performance figures appear to be middle-of-the-road. The company, like most other vendors, provides the maximum Ethernet filtering rate, which is theoretically 14,900 packet/sec. Some vendors, including Codex, say they filter 15,000; the company's 4,000 packet/sec forwarding rate falls below that of some other vendors.

Wellfleet Communications, Inc., for example, says it forwards 14,000 packet/sec, the same number that it filters; Cryptall Communications Corp. says it forwards 7,300 packet/sec on its 3000 Series bridge. Digital Equipment Corp., which sells two bridges manufactured by Vitalink Communications Corp., posts forwarding rates of 2,000 and 5,000 packet/sec.

These figures, however, are not necessarily the true indication of a bridge's performance. Users must get vendors to describe exactly how they are measuring these forwarding rates, consultants cautioned.

The absence of an accepted standard for determining packet forwarding rates makes it possible for vendors to use different techniques, such as different packet sizes, to obtain optimum figures.

"Generally, it's something I don't pay much attention to because of the discrepancies in how benchmarks are performed — unless it very specifically states the packet size involved," Baldwin said.

Leary also advised skepticism on the part of users. "I think it's more important to get hold of real-world accounts running configurations similar to yours."

Although price comparisons may not be as important as the functionality offered by the bridge, Codex's product, priced at $11,985, falls in the middle of price comparisons. Ungermann-Bass, Inc. sells its Ethernet T-1 bridge for $6,500; DEC bridges supporting T-1 lines, on the other hand, start at $15,770.

First Look

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A workstation-only implementation of NFS and a coaxial NI9210 costs $785, while a package that includes an NI9210 for unshielded twisted-pair media costs $885. Both are available now.

Racal InterLan, Inc., 155 Swanson Road, Boxborough, Mass. 01719; (508) 263-9929.

Alloy links IBM PCs, Macs, 386/MultiWare

Alloy Computer Products, Inc. recently introduced enhanced versions of its MAC-Attach and Link-PC software products that enable Apple Computer, Inc. Macintoshes and IBM Personal Computers to connect to the company's 386/MultiWare networks.

386/MultiWare is a DOS-based multiuser, multitasking network operating system that enables as many as 21 local-area network users to share an Intel Corp. 80386-based server to exchange files, electronic mail messages and peripheral services.

MAC-Attach Version 2.0 is a terminal-emulation program that enables Macintoshes to participate as peers on a 386/MultiWare network.

The latest version of MAC-Attach lets users toggle between their Macintoshes and the 386/MultiWare LAN for the first time, performing processing either on their local machine or the network as required for a particular application. In addition, MAC-Attach Version 2.0 now supports the Macintosh's windowing environment.

Alloy's Link-PC is terminal-emulation software that allows personal computers to connect to 386/MultiWare LANs.

The latest release, **Link-PC Version 3.0,** for the first time, gives users the capability to hot key between their personal computer sessions and server sessions.

MAC-Attach Version 2.0 and Link-PC Version 3.0 are available now; each software product costs $195.

Alloy Computer Products, Inc., 165 Forest St., Marlborough, Mass. 01752; (508) 481-8500.

TOPS folds E-mail, software

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little as 65K bytes, and it also has been rewritten in a modular fashion so that users can load only the network services they require.

The TOPS/DOS 3.0 product supports the Hierarchical File System (HFS), which lets DOS-based personal computers act as file servers for Macintosh systems.

With HFS, multiuser Macintosh data bases, accounting packages and other applications can be stored on a DOS computer on the network, even though they actually run on a Macintosh.

Other new features include enhanced printing options.

The Network Bundle for Macintosh is available now for $299 per workstation. The Network Bundle for DOS will be available in mid-February for $249.

TOPS said it will offer TOPS/Macintosh, and TOPS/DOS 2.0 and 2.1 users an upgrade to the new Network Bundles for $125 each or both for $185. The upgrade includes InBox 3.0.

InBox 3.0 and InBox Plus can still be purchased separately and should be available late this month and early February, respectively. InBox 3.0 is designed for smaller work groups of up to 20 users, while InBox Plus supports multiple mail systems of up to 100 users and includes gateways to private and public mail systems.

SYSM bolsters E-mail

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input lengthy addresses.

SYSM Release 6.3 also offers, for the first time, varying types of in basket sorting. Prior to this release, users either had to read incoming messages immediately or access a list of all those received in their in basket. Now, they can request that the software sort messages by categories, such as topic or date received.

Another new feature is maintenance of user IDs, which will eliminate the need to migrate all files to a user's new ID manually when it changes, such as when a woman gets married and changes her ID or when a user changes departments. When the ID is changed, all files belonging to it can be migrated automatically to the new ID.

"This is something network administrators love," Peterson said. "Users never see it, but they benefit automatically."

PROFS, by contrast, generally requires a greater degree of administration than SYSM, including transferring files when user ID names change, according to John Baxa, manager of technical services in the information systems department at Detroit Osteopathic Hospital.

In addition to these new features, H&W Computer Systems also upgraded several utilities within the earlier release, such as electronic forms and calendaring/scheduling.

Electronic forms, which enable users in an insurance company, for example, to integrate commonly used forms into E-mail messages, are now maintained in directories, whereas in the past, users had to remember the name of a form required for a particular application.

One of several enhancements to users' personal calendaring/scheduling capability is moving to-do lists, which automatically remind users if they have failed to complete a task they included in a to-do list. "This is a terrible nag command, but we've had a lot of positive response to it," Peterson said.

The functionality offered by SYSM Release 6.3 prompted Detroit Osteopathic Hospital to abandon PROFS, which it had been using since 1984, Baxa said.

The user is in the process of retiring an antiquated IBM-compatible mainframe made by now-defunct Magnusson Computer Systems, Inc. It had been maintaining the mainframe exclusively to run PROFS under VM. Baxa said the company wanted to migrate its E-mail system to its MVS/XA-based IBM 3081 mainframe rather than run it under VM.

SYSM 6.3 vs. PROFS

To run PROFS on the 3081 would have required a PROFS upgrade, which Baxa said was not cost-justified.

One area in which SYSM 6.3 offers better functionality than PROFS is in its ability to more easily integrate frequently used business documents in E-mail messages, Baxa said. This will also enable the user to integrate many forms, reports, external letters and internal memos into its E-mail system.

"We like what we see so far," Baxa said. "Expanding the size of the system and getting more people to use it are our primary goals right now."

About 130 employees used PROFS, whereas about 230 will use SYSM 6.3.

Baxa expects SYSM 6.3 to pay for itself within about six months, whereas the company spent about $60,000 a year to maintain a CPU exclusively for PROFS, as well as $1,000 a month for the IBM E-mail package. Because SYSM runs under MVS/XA, it won't require a CPU dedicated to E-mail.

SYSM 6.3 is available now; it costs $23,000 for OS- and MVS/XA-based mainframes, and $12,900 for DOS/VSE mainframes. Optional interfaces to other systems, which were previously available, cost $5,000.

H&W Computer Systems can be reached in writing at P.O. Box 15190, Boise, Idaho, or call (208) 385-0336.

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OPINIONS

STRATEGIC SYSTEMS PLANNING

BY JAMES KOBIELUS

Teamwork, not computers, is key to success

There's a big difference between strategic business planning and run-of-the-mill systems planning, but few information systems (IS) and telecommunications professionals seem to appreciate it.

There's nothing terribly strategic about most information technology systems planning methodologies. In general, they are static, conservative and inward-looking. They produce matrices and flow diagrams that are professional in appearance but dry as dust. And, predictably, they almost always recommend development of big, corporate "infodumps" to sit on big, corporate "metal" — the proverbial data bases that conquered Cleveland.

> An organization stands or falls by the ability of its people to band together.
>
> ▲▲▲

The ever-popular information engineering approach is typical in this regard. It is geared toward filling out the organization's portfolio of data base applications. Any corporate function — for example, marketing and human resources — lacking a shared data base becomes an immediate candidate for one, whether it needs it or not.

Information engineering is typical of systems planning approaches that propose solutions for nonexistent problems. They automate for automation's sake. And they are usually biased toward data processing systems.

Indeed, most systems planning methodologies are just thinly disguised marketing tools for the corporate IS function.

Team building

A truly strategic systems planning methodology steps back from solutions per se and focuses on organizational team building. Teams — not computers — drive the business. Teams are the prime information processors. An organization stands or falls by the ability of its people to band together in support of common goals.

Simply throwing data bases at every corporate function does little to improve coordination, communications and information sharing among decision makers. The data flow diagrams upon which such systems are built tend to overlook the web of interpersonal relationships — internal and external — that distinguish winning organizations from losing ones.

Telecommunications professionals must concern themselves more with first building teamwork environments and then specific computer and communications solutions. The overall work environment — founded on coordination, communications and decision support systems — is the springboard for corporate growth and development.

A team-oriented planning approach gives greater emphasis to telecommunications-based recommendations. Few card-carrying IS professionals would recommend voice-messaging, multimedia conferencing, or groupware technologies, when these would effect the most profound changes in day-to-day operations.

A team-oriented systems planning approach also instills a healthy dose of humility in communications professionals. They begin to realize that the most critical ingredients of corporate teamwork — clear vision, mutual respect, a supportive corporate culture — are beyond their control. All that communications professionals can contribute to the strategic mix are some useful tools for collaboration and resource sharing.

What users make of these tools is largely up to them.

Kobielus consults on information technology in Alexandria, Va.

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EDITORIAL

Telcos must deal with ANI privacy concerns now

If telephone companies don't act soon, they may lose control over a powerful and potentially lucrative technology — automatic number identification (ANI).

Several consumer watchdog and civil liberties organizations have voiced strong opposition to new or proposed caller identification services, citing concerns about caller privacy, among other fears. Yet telephone companies have been reluctant to deal with these legitimate concerns.

Carriers say that solutions such as blocking calling number identification for some customers may limit the value of ANI to caller ID service subscribers — particularly major companies such as telemarketing organizations, which are highly interested in such services. That's too bad, because this shortsightedness may ultimately lead to some real limitations on the use and availability of ANI.

It's time for telephone companies to formulate a consistent approach to offering caller ID services, one that takes into account the needs of customers who are concerned about their right to keep their telephone number private.

Carriers must work as allies — not opponents — of consumer and civil liberties groups and find solutions that will work throughout the country. A common carrierwide ANI strategy is absolutely essential if the vision of the nationwide intelligent public network is to be realized.

If carriers delay action on this issue, they'll lose control to state public utility commissions, state courts — even the U.S. Congress or federal courts. Telephone companies could wind up dealing with a multitude of conflicting and confusing state regulations that *really* limit the value of ANI.

The phone companies risk being viewed as adversaries while these regulations are being drafted. And that's hardly the best position to be in when you're trying to maximize your business opportunities. Regulations or legislation may be designed to reflect only the needs of residential customers and not business users, carriers or other vendors.

> A common carrierwide ANI strategy is essential if the vision of the nationwide intelligent public net is to be realized.
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If carriers need proof that the time for action is now, they need look only as far as the state of Pennsylvania, where a state appeals court in late December blocked Bell of Pennsylvania from offering caller ID services until some thorny legal issues could be resolved ("Court weighs legal issues of caller ID," *NW,* Jan. 8).

In the Pennsylvania case, the carrier's opponents wanted customers to be allowed, free of charge and on a call-by-call basis, to prevent their phone numbers from appearing on a display device on the recipient's telephone.

Opponents of caller ID say this is a test case that may presage what will happen in other parts of the country.

ANI has already experienced choppy waters in New Jersey and California. In California, the legislature recently passed a law mandating that customers have call blocking as an option if caller ID service is offered in the state. Caller ID is also under scrutiny in Washington, D.C. and North Carolina, where hearings are currently being held on these services. The debate over ANI is likely to crop up in other areas of the country as well.

It's clear that telephone companies need to get together to provide some good answers about ANI while they still control the technology.

Otherwise, the solutions ultimately chosen may not be very palatable to the telephone companies or to their major corporate customers. The carriers and concerned parties must cooperate now to reach a good solution.

There's a problem here, and the time for action is now.

OPINIONS

NETWORK MANAGEMENT

BY WILLIAM VASQUEZ

Standards groups have their work cut out for them

The integration of computers and networks, the spread of heterogeneous equipment within end-user networks, and the interest and resulting sophistication of users regarding network management have combined to make network management standards a priority for the very near future.

The questions now are: Just how standard is standard, and who decides what is standard? Many users and providers will quickly answer with an alphabet of acronyms that may include ISO, OSI/NM Forum, ANSI, IEEE, NIST, CCITT and COS, with perhaps various Bell operating company terms thrown in for good measure.

With this many standards chefs stirring the pot, it's easy to see why both providers and users are confused regarding network management standards. Unlike equipment providers, standards groups cannot claim product differentiation or competitive advantage as justification for different standards or different versions of the same standard.

Standards, like death and taxes, tend to be seen as "is or ain't" propositions.

Knowledgeable users and providers seem to agree on the following:

- There is too much overlap in standards efforts.
- Standards take too much time to be defined.
- No one seems to have come up with a universal architecture or model for which everyone else should be shooting.

It's true that there is redundancy in standards efforts. While protocol and service definitions are progressing, managed object templates for system management — which provide the format for the description of a network element — appear to have multiple definitions depending on who's doing the talking.

Also, the structure and contents of the management information base, which is the composite of all objects and templates, and directory services, a source of information about managed objects, seem to be in question.

Some good news is that a CCITT recommendation — X.500 — is making headway toward defining directory services.

Some authority — perhaps the ANSI X3 Strategic Planning Committee, which develops standards for information processing systems — should be in charge of assigning distinct responsibilities to each of the standards groups. This committee also would monitor for overlap among standards groups and issue reminders of areas of responsibility.

For example, ANSI X3S3, the standards body responsible for the data communications network layer, should define layer management objects for protocol stacks. Templates for objects, attributes and events for system management should be left to experts such as those in ANSI T1M1, which is responsible for internetwork operations, administration, maintenance and provisioning.

More sharing

In addition, industry groups and standards groups could speed up the process by sharing their documents early in draft stages and agreeing on who should handle which items before redundancy becomes an issue. To date, sharing of preliminary findings seems to be somewhat minimal.

The solution may be in forming liaison committees. For example, the Open Systems Interconnection/Network Management (OSI/NM) Forum appointed a liaison chair to work with standards groups, but sharing information is still the exception rather than the rule. A stronger coordinating role by the ANSI X3 Strategic Planning Committee would help solve this problem.

Another source of delay is the standards groups' sometimes excessive desire to refine and reformat standards. For example, the restructuring of the components of the Management Functional Areas — such as configuration and performance — by the International Standards Organization Joint Technical Committee I caused a stir among standards participants.

Many said they thought the restructuring was unnecessary because it seemed to resemble the argument about whether inventory should constitute part of the configuration or the accounting function. Does it really matter if inventory is part of the configuration or accounting function as long as it is there?

Lastly, creating a universal architecture requires coordination among standards-making organizations. Perhaps a higher level group, such as the ANSI X3 Strategic Planning Committee, should gather a group of expert representatives from the other standards groups to find an architecture that is satisfactory to all.

Models such as the Bell Communications Research architecture for distributed operations systems and AT&T's Unified Network Management Architecture should be considered working examples. ANSI T1M1 also has a model for a single network management center that might fit the final architecture.

The desire for network management standards has never been stronger; users, providers, industry groups and standards groups should take advantage of the interest. Users want "everything to talk to everything," and providers, to remain providers, must find a way to keep users happy.

Industry groups, such as the OSI/NM Forum, are working hard to enable some things to talk to other things. But for everything to talk to everything, standards groups and all involved parties will have to get cracking.

What is missing appears to be the will and the way to do so. Until that is found, standards will be the bane of network managers' existence, rather than the boon they promise to become.

Vasquez is a product manager of integrated network management systems at Racal-Milgo in Sunrise, Fla.

DID YOU RESOLVE TO WRITE A COLUMN for *Network World*'s Opinions pages in 1990? Start the new year right and send it in!

Manuscripts should be letter-quality, double-spaced and between 600 and 900 words long. Disk or modem submissions are preferred.

If you'd like to write a column, call Steve Moore, features editor, at (508) 875-6400, ext. 732, or fax your idea to us at (508) 820-3467.

TELETOONS

BY FRANK AND TROISE

LETTERS

Solution to ANI debate

Recent articles concerning automatic number identification (ANI) have discussed the problem of people making phone calls and having their unlisted phone number displayed to the recipient.

Why not require the local phone companies to assign a pseudo-phone number with each unlisted number? Phone companies that put the originating phone number into the data stream would instead insert the pseudo-phone number when a call was made from an unlisted number.

Privacy would be maintained for the caller, and the recipient would have no way of knowing the real phone number. Since the same pseudo-phone number would always be associated with the same originating unlisted phone number, the caller could be identified before the call is answered.

Authorized government agencies could be provided with a data base that translates the pseudo-phone numbers to real numbers for use when an emergency phone call is placed from an unlisted phone number. Crank calls could also easily be traced by authorized personnel.

I see only two disadvantages: there would be extra bookkeeping associated with keeping track of the pseudo-phone numbers; and these pseudo-phone numbers would have to be identified as such. This could be accomplished either by assigning them within a unique exchange or by having the phone companies indicate that the number is a pseudo-phone number.

Overall, this approach would protect the interests and privacy of the caller and the recipient, while placing a small, tolerable burden on the local telephone companies.

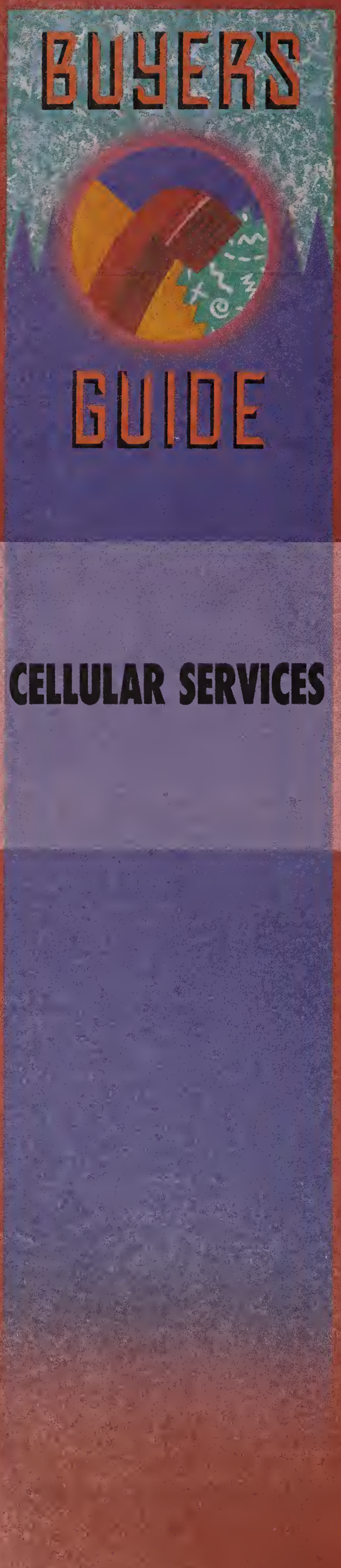
Harold Fischman
Senior vice-president
American Healthware
Brooklyn, N.Y.

Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *161 Worcester Road, Box 9172, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

TELECOM



Not just a yuppie toy

CONTINUED FROM PAGE 1
ceived cellular phones as Christmas presents this year — some at bargain-basement prices of as low as $200.

In fact, most of the growth in the industry has centered on this lower end of the market — the residential or small business user.

Cellular service expands

Cellular service is expanding rapidly across the U.S. All major metropolitan areas are now outfitted with service, and rural areas are beginning to receive service.

The nation is divided into a series of cell groups — areas of service coverage resembling local telephone company service areas. Each cell has a transmitter and receiver that coordinates all cellular communications in that cell. It interfaces with other company cell sites in the same way that central offices communicate in the local exchange environment — through sophisticated switch signaling.

Briere is president of TeleChoice, Inc., a Manchester, Conn., telecommunications consultancy specializing in long-distance service analysis and network design. He can be reached at (203) 645-0471.

Each potential market has been divided into two competing licensing arrangements: non-wireline (called System A) and wireline (called System B). The area in which a licensee is allowed to operate is called a cellular geographic service area.

Depending on how a local area is defined, however, some metropolitan areas have more than two carriers providing cellular service.

Cellular services are not tied to a particular telephone model; industry standards allow different phones to work on different cellular systems. This enhances a user's ability to switch carriers.

Typically, three types of cellular phones exist:

■ **Vehicular or mobile models.** These are designed to be installed in a car, where they operate by using the vehicle's electrical system. Some units offer voice-activated service, allowing for hands-free operation.

■ **Transportable models.** These compact units have their own battery power supply, but they can also receive power from other sources through accessories, such as a cigarette lighter connector plug.

■ **Portable models.** Typically smaller than transportable phones, these are small enough to fit into a briefcase or pocket. They are generally less powerful as well, limiting their effective distance compared with the higher powered transportable or vehicular models. Due to their reliance on batteries, talk time is limited to the life of the battery — a few hours at most.

The type of cellular phone a company selects depends largely on the application for which it will be used. Companies are realizing that cellular phones, particularly the portable or transportable models, have many more uses than originally imagined. As batteries get smaller, portable models may become the most requested equipment.

Disaster recovery is one reason why many firms are buying transportable models. By providing each major department with a cellular phone — at a fraction above the cost of local service lines — companies are assured of at least one communications route to and from each center in case of local service loss.

Recent disasters such as the Hinsdale, Ill., central office fire of May 1988 and the San Francisco earthquake last October have tested the applicability of such backup systems.

During the Hinsdale disaster, one firm was able to retain the flow of inbound calls, despite restrictions in the local exchange

carrier network, simply because its sales force had cellular phones in their cars.

If the company had transportable units, however, it would not have had to station secretaries in cars in the company parking lot to receive calls.

Cellular services

Most of the cellular service providers offer a series of niche services, each targeted at a specific range of uses, rather than just one bulk calling service. Among the different areas covered are:

■ **Individual business plans.** These satisfy single-phone users who have a relatively small volume of calling.

■ **Corporate plans.** These volume plans group multiple phones under a single pricing and discount plan.

■ **Dispatch services.** These are designed for courier and delivery companies that typically make calls lasting less than 30 seconds. With rates rising significantly after 30 seconds, dispatch services discourage long-duration calls.

■ **Residential plans.** These off-peak calling plans offer cut-rate off-peak rates and very high peak rates.

Typically, services charge subscribers a monthly fee, plus per-minute usage fees. With some services, users are given an allotment of free minutes with the monthly fee.

Usage rates can vary depending on time of day and number of phones on the account. Calls are generally rounded up to the next higher full minute, but some carriers have instituted smaller increment billing, such as plans that round up to the nearest 30 seconds or six seconds.

However, be sure to check how your carrier bills for outbound calls. Many do not have answer supervision, which is the ability of the equipment to detect whether the called party has answered the phone. In these cases, the user pays for calls from the time the number is dialed. Any savings gleaned from shorter incremental billing could easily be lost by not having answer supervision.

Cellular service can result in substantial cost savings for users in large metropolitan areas where standard telephone calls from one end of the city to the other are charged toll rates. With cellular, calls from any point in the system to any other point are distance-insensitive, allowing users to reap savings in toll charges.

Enhanced features

One big attraction of today's cellular phones is the myriad of features they sport. Most are offered as standard features or at marginal extra cost.

Some of the features offered by cellular providers around the nation include:

■ **Voice messaging.** Now a fairly universal feature in many areas, voice mail enables users to receive messages when the cellu-

(continued on page 48)

Savvy business users can benefit greatly from judicious use of cellular technology.

CHART • GUIDE

A *Network World* Buyer's Guide chart containing information on the features of cellular services in 20 major U.S. cities can be found beginning on page 41.

ATTENTION

California Network Managers

Network Management Solutions (NMS), the industry's premier network management conference, is coming to California April 10-12 at the Anaheim Hilton Hotel.

NMS, in its third year, has earned a reputation among attendees as the network management industry's yearly summit meeting bringing together the country's leading users and vendors to focus on one topic . . . network management.

NMS is a unique opportunity to experience 'hands on' live demonstrations of the network management offerings from the world's premier network management vendors. Companies like:

- AT&T
- DCA
- DEC
- IBM
- General DataComm
- Hewlett-Packard
- Make Systems
- MCI
- Northern Telecom
- Synoptics

and others have demonstrated their network management products at NMS.

The 1990 NMS program will offer these topic tracks that will run all three days:

- LAN Network Management
- WAN Network Management
- User Case Studies

The three-track program will give you the opportunity to concentrate on one topic area, or mix and match sessions.

But hurry because there are only 500 reservation opportunities for NMS.

If you feel knowing more about network management would help you do a better job and give your company an added competitive advantage in your market, I urge you to call 508-879-6700 or fax 508-872-8237 immediately to evaluate our program.

See you in Anaheim.

Gary J. Beach
President/Publisher
Network World

NETWORK MANAGEMENT SOLUTIONS

NETWORK WORLD

Cellular services — top 20 metro areas (continued on page 42)

Company	Areas covered/ System type	Extended area, allied providers	Basic service plan/Service fees	Time periods	Usage rates*	Charges for unanswered calls or busy	Company billing policy	Service options	Call restriction options	Call following	Voice-messaging options	Other options	Visitor rates*
New York City													
Metro One Rochelle Park, N.J. (201) 587-8000	New York/ System A	MetroMobile (Conn., Mass.), Cellular One (N.J.)	Preferred Plan A/$40 installation; $29 monthly	Peak, 8 a.m. to 8 p.m., Mon.-Fri.; Off-peak, all other hours	Peak, $.55; Off-peak, $.35	None	Answer supervision	CW, Yes; CF (3)**, Yes; NA/BT (3), Yes; TPC, Yes	Local only; international only; inbound only; outbound only	No	Basic, 1-min message with 1-min greeting, 16-message max. over 48 hours; Enhanced, 5-min message with 5-min greeting, 32-message max. over 7 days	Announce-ment service	$3 installation; $.75/min
Nynex Mobile Communications Pearl River, N.Y. (914) 577-5200	Long Branch, N.Y., New Brunswick, N.Y., New York/ System B	No	Service Plan A/$40 installation; $29 monthly	Peak, 8 a.m. to 8 p.m., Mon.-Fri.; Off-peak, all other hours	Peak, $.60; Off-peak, $.40	None	Send supervision	CW, Yes; CF, Yes; NA/BT (3), Yes; TPC, Yes	Local NPA only; inbound only; outbound only	No, (roaming agree-ments with carriers)	No (first quarter 1990)		$0 installation; $.75/min
Cellular One Concast Cellular Iselin, N.J. (201) 855-0200 (800) 227-9222	Long Branch, N.Y., New Brunswick, N.Y./System A	Metro One (N.J.), Metrophone (N.J.), Cellular One (Atlantic City), Cellular One (Wilmington, Del.)	Local Plan (Central New Jersey)/$39.95 installation; $14.95 monthly	Peak, 7 a.m. to 9 p.m., Mon.-Fri.; Off-peak, all other hours	Peak, $.45; Off-peak, $.45	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; outbound only; inbound only	No	Yes		$3 (9) installation; $.85/min
Los Angeles													
Los Angeles Cellular Telephone Co. City of Commerce, Calif. (213) 721-3939	Los Angeles/ System A	Ventura Cellular coverage area	Standard Plan/$50 installation; $45 monthly	Peak, 7 a.m. to 7 p.m., Mon.-Fri.; Off-peak, all other hours	Peak, $.45; Off-peak, $.27	Yes, 1/2 airtime	Send supervision	CW, Yes; CF 3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Yes	Yes		NA
PacTel Cellular Irvine, Calif. (714) 553-6000	Los Angeles, Oxnard, Calif./System B	No	Basic Service/$50 installation; $45 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.45; Off-peak, $.27	Yes, 1/2 airtime	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), No; TPC, Yes	Local only; inbound only; outbound only; Hot line (13)	No	Yes		$0 installation; $.70/min
Ventura Cellular McCaw Communications, Inc. Camarillo, Calif. (805) 987-0955	Oxnard, Calif./System A	Los Angeles through LA Cellular	Standard/$50 installation; $45 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.45; Off-peak, $.27	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; outbound only; inbound only; Outbound-specific number	Yes, Super Cellular Network	No		NA
Chicago													
Cellular One Southwestern Bell Mobile Systems Schaumburg, Ill. (708) 882-2181 (800) 235-5663	Aurora, Ill., Chicago, Elgin, Ill., Gary, Ind., Joliet, Ill., Kankakee, Ill./System A	Joliet, Ill., Gary, Ind.	Standard Service/$35 Installation; $15 monthly	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.34; Off-peak, $.20	None	Answer supervision	CW, Yes (1); CF (3), Yes; NA/BT, Yes; TPC, Yes	Inbound only; local only	Yes	Date/time stamp basic package, stores 25 3-min messages for 15 days plus 3-min greeting; Advanced package, stores 45 5-min messages for 30 days plus 5-min greeting		$2 installation; $.75/min
Ameritech Mobile Communications Schaumburg, Ill. (312) 706-7600	Aurora, Ill., Chicago, Elgin, Ill., Gary, Ind., Joliet, Ill., Kankakee, Ill./System B)	Peoria, Ill., Rockford, Ill., Quad Cities, Ill.	Volume Incentive Plan/$35 installation; $20 Directory Listing; $16 monthly	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Varies according to volume; Peak, $.38 to $.31; Off-peak, $.22 to $.16 (5)	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes, programmable or automatic; TPC, Yes	Local only; inbound only; outbound only; outbound restricted	Yes, Fast Track	Standard; enhanced	Account Codes, Speed Dialing, Paging, Data Service	$2 installation; $.75/min
Philadelphia													
Metrophone Valley Forge, Pa. (215) 666-9850	Philadelphia, Trenton, N.J./System A	No	Executive Service I/$40 installation; $39.95 monthly	Peak, 7a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.50; Off-peak, $.30; Allowance: Peak, 60 min; Off-peak, 60 min	Over 45 sec	More than 6 rings, or answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Yes	MetroLink		$3 installation; $.85/min
Bell Atlantic Mobile Systems Trevose, Pa. (201) 953-2200	Allentown, Pa., Philadelphia, Reading, Pa., Trenton, N.J., Wilmington, Del./System B	Pittsburgh, other points in Pennsylvania and West Virginia	Value Plan (#2) (1-2 phones per account)/ Installation fees: 1 phone, $40; 2-4 phones, $25; 5-24 phones, $15; 25+ phones, $0; $39 monthly	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.50; Off-peak, $.30; Peak allowance, 60 min; Off-peak allowance, 60 min	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	No	Date/time stamp		$3 installation; $.85/min
Cellular One Vanguard Cellular Systems Whitehall, Pa. (215) 390-2355	Allentown, Pa., Reading, Pa./System A	Philadelphia Metrophone	Introductory Service/$25 installation; $7.50 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; off-peak, all other hours	Peak, $.55; off-peak, $.20	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	No	Voice Mail		$3 installation; $.75/min
Detroit													
Cellular One PacTel Cellular Farmington Hills, Mich. (313) 737-5100	Detroit, Flint, Mich., Grand Rapids, Mich., Lansing, Mich., Muskegon, Mich., Saginaw, Mich./System A	No	Business Plus/$35 installation; $30 monthly	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Varies according to volume; Peak, $.35 to $.26; Off-peak: $.16	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	CSGA; inbound only; outbound only; hot line	No	Optional message alert service; Optional message broadcast		$2 installation; $.75/min
Ameritech Mobile Communications Farmington Hills, Mich. (800) 221-0994	Detroit, Flint, Mich./System B	Windsor, Canada, Lansing, Mich., Grand Rapids, Mich., Detroit, Points in Ohio and Indiana	Volume Incentive Plan (VIP)/$35 installation; $20 Directory Listing; $29.95 monthly	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Varies according to volume; Peak, $.35 to $.28; Off-peak, $.16 to $.14	None	From first ring	CW, Yes; CF (3), Yes; NA/BT (3), Yes, programmable or automatic; TPC, Yes	Local only; inbound only; outbound only; outbound restricted	Yes, Fast Track	Standard; enhanced	Account codes; Data service	$2 installation; $.75/min

CF = Call forwarding
CW = Call waiting
NA = Information not available
NA/BT = No answer/Busy transfer
TPC = Three-party conferencing

* Unless otherwise noted, carriers bill in one-minute increments.
** See page 48 for explanation of numbers in parentheses.

The information in this chart was provided by the service providers listed. Questions about chart listings should be directed to the individual providers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

Cellular services — top 20 metro areas (continued on page 43)

Company	Areas covered/ System type	Extended area, allied providers	Basic service plan/Service fees	Time periods	Usage rates*	Charges for unanswered calls or busy	Company billing policy	Service options	Call restriction options	Call following	Voice messaging options	Other options	Visitor rates*
Detroit cont'd													
Cellular One Kalamazoo, Mich. (616) 965-1100	Battle Creek, Mich., Kalamazoo/ System A	No	Option I/$25 installation; $7.50 monthly	Peak, 8 a.m. to 8 p.m., Mon.-Fri.; Off-peak, all other times	Peak, $.35; off-peak, $.16	None	Answer supervision	CW, Yes; CF (3)**, Yes; NA/BT (3), Yes; TPC, Yes	No	No	No		$2 installation; $.75/min
Century Cellunet Grand Rapids, Mich. (616) 940-0985	Battle Creek, Mich., Benton Harbor, Mich., Grand Rapids, Jackson, Mich., Kalamazoo, Mich., Lansing, Mich., Muskegon, Mich., Saginaw, Mich./System B	No	StartPak/$25 installation; $7.50 monthly	None	$.45	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	No	No	No		$2 installation; $.75/min
Boston													
Cellular One Southwestern Bell Mobile Systems Waltham, Mass. (617) 890-1555	Boston, Worcester, Mass./System A	Points in Conn., N.H., Maine, R.I., Mass.	Plan B/$35 installation; $19 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; off-peak, all other times	Peak, $.44; off-peak, $.29	None	First ring	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	No	Yes		$3 installation; $.75/min
Nynex Mobile Communications Woburn, Mass. (617) 932-1200 (800) 538-4747	Boston, New Bedford, Mass., Providence, R.I., Worcester, Mass./System B	Maine, Nashua, N.H., Manchester, N.H.	Plan A/$40 installation; $19 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.45; Off-peak, $.30	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Yes, Follow Me Roaming	No (first quarter 1990)		$3 installation; $.65/min
Metro Mobile CTS Providence, R.I. (401) 272-3800	New Bedford, Mass., Providence, R.I./System A	Throughout Northeast, Southwest, Southeast	Package B/$25 installation; $19 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.44; Off-peak, $.26 (per 30 sec subject to 1 min minimum)	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	No	No	Yes		$3 installation; $.75/min; No daily fee for users from other New England cellular companies
San Francisco													
Cellular One Bay Area Cellular Telephone Co. Burlingame, Calif. (415) 340-9500	Petaluma, Calif., San Francisco, San Jose, Calif., Santa Rosa, Calif., Vallejo, Calif./System A	(Super Access System)	Basic Plan/$25 installation; $45 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.45; Off-peak, $.20	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	U.S. only; Canada only; Mexico only; California only; CGSA only; 411, 911, 611, and operator restriction	Super Access System	Yes	Do Not Disturb	$2 installation; $.50/min
GTE Mobilnet Hayward, Calif. (415) 783-9200 (800) 366-5665	Petaluma, Calif., San Francisco, San Jose, Calif., Santa Rosa, Calif., Vallejo, Calif./System B	No	Business Club; Basic Plus (1 year commitment)/ $25 installation; $39.50 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.45; Off-peak, $.20	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Follow Me Roaming	Yes		$2 installation; $.50/min; (GTE Mobile subscribers pay home rate only)
Washington, D.C.													
Cellular One Greenbelt, Md. (301) 220-3600	Baltimore, Washington, D.C./System A	No	The Advantage Plan/$50 installation; $37 (19) monthly; Allowance, 75 min peak; 75 min off-peak	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.55; Off-peak, $.24	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; ten-digit calls only; mobile-to-mobile only; inbound only	No	Yes		$2 installation; $.65/min
Bell Atlantic Mobile Systems Baltimore (201) 953-2200 (301) 646-5700	Baltimore, Washington, D.C./System B	No	Moderate Plan #3/Installation fees: 1 phone, $40; 2-9 phones, $25; 10-24 phones, $15; 25+ phones, $0; Monthly fees: 1-2 phones, $50; 3-9 phones, $45	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other hours	Peak, $.36; Off-peak, $.36	$.10	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Inbound only; outbound only; local only	No	Yes		$2 installation; $.65/min
Dallas/Fort Worth													
MetroCel Cellular Telephone Co. Dallas (214) 380-8771	Dallas, Dennison, Texas, Fort Worth, Texas, Sherman, Texas/ System A	Gran Tour Roaming (most of Texas)	Basic Plan with Usage Credit Service Fees/$20 installation; $35 monthly (includes volume discounts for usage over $200 and requires yearly contract)	Daytime, 7 a.m. to 8 p.m.; Evening, 8 p.m. to 11 p.m.; Late night, 11 p.m. to 7 a.m.	Daytime, $.38 Mon.-Fri.; $.22 weekends; evening, $.22; late night, $.12	None for less than 29 sec; 29+ sec billed at airtime rate	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), No; TPC, Yes	Local only; inbound only; outbound only	No	Yes		$3 installation; $.75/min
Southwestern Bell Mobile Systems Dallas (214) 733-2133	Dallas, Dennison, Texas, Fort Worth, Texas, Sherman, Texas/ System B	All of Texas except El Paso, Laredo, Wichita Falls	Basic Service Plan/$15 installation; $35 monthly	Peak, 7 a.m. to 8 p.m. Mon.-Fri.; Off-peak, 8 p.m. to 11 p.m. Mon.-Fri., 7 a.m. to 11 p.m. Weekends; Late night, 11 p.m. to 7 a.m. every day	Peak, $.38; Off-peak, $.22, Late night, $.12; Rates taper to give discounts for usage over 240 min and 360 min	None for less than 31 sec, billed airtime rate for 31 sec and above	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes, Part of CF; TPC, Yes	Yes, local only; inbound only; outbound only	Follow Me Roaming	Yes		$2 installation; $.50/min
Houston													
Houston Cellular Telephone Co. Houston (713) 688-8225	Houston/System A	No	Economy Plan/ installation fees: 1 phone, $25; 2-10 phones, $23.75; 10+ phones, $21.25; $14.95 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, 7 p.m. to 7 a.m. Mon.-Fri., 7 a.m. to 12 a.m. Weekends; Late night, 12 a.m. to 7 a.m. every day	Peak, $.60; Off-peak, $.20; Late night, $.05; with annual contract: Peak, $.48; Off-peak, $.16; Late night, $.04	None for less than 1 min, billed airtime rate for 1 min and above	Send supervision	CW, Yes, CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Yes, local only; inbound only; outbound only	Nation Link	Yes		$3 installation; $.75/min

CF = Call forwarding
CW = Call waiting
NA = Information not available
NA/BT = No answer/Busy transfer
TPC = Three-party conferencing

* Unless otherwise noted, carriers bill in one-minute increments.
** See page 48 for explanation of numbers in parentheses.

The information in this chart was provided by the service providers listed. Questions about chart listings should be directed to the individual providers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

Cellular services — top 20 metro areas (continued on page 46)

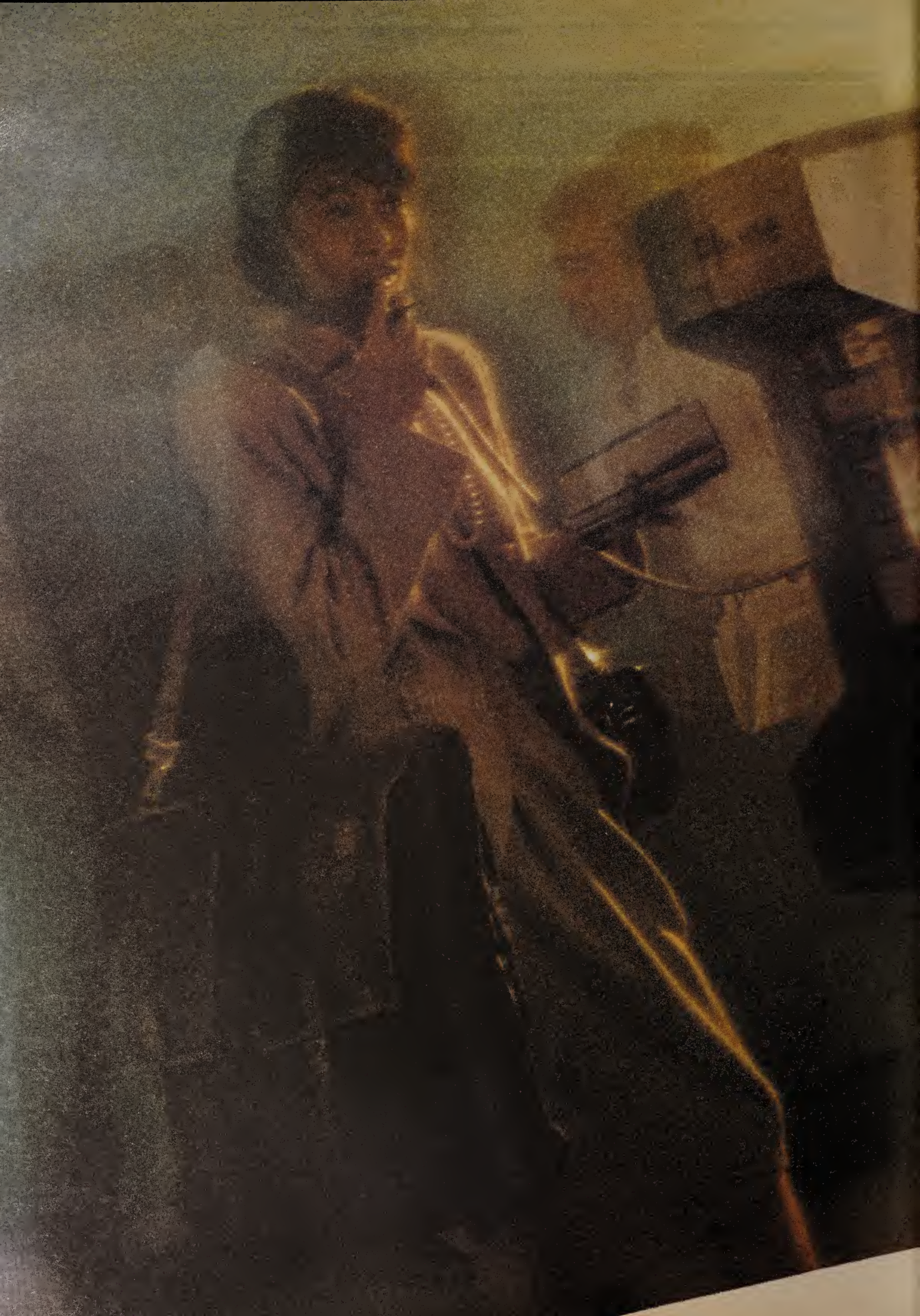
Company	Areas covered/ System type	Extended area, allied providers	Basic service plan/ Service fees	Time periods	Usage rates*	Charges for unanswered calls or busy	Company billing policy	Service options	Call restriction options	Call following	Voice-messaging options	Other options	Visitor rates*
Houston cont'd													
GTE Mobilnet Houston (713) 893-9000 (800) 323-3513	Beaumont, Texas, Galveston, Texas, Houston/ System B	State of Texas (charged home peak rate)	Basic Option/$25 installation; $35 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, 7 p.m. to 7 a.m. Mon.-Fri., 7 a.m. to 12 a.m. Weekends; Late night, 12 a.m. to 7 a.m. every day	Peak, $.39; Off-peak, $.20; Late night, $.05; With 1-year contract: Peak, $.31; Off-peak, $.16; Late night, $.04	None	Answer supervision	CW, Yes; CF (3)**, Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Follow Me Roaming	Yes		$2 installation; $.50/min (GTE Mobilnet and Texas subscribers of Contel and Southwestern Bell pay home peak only)
Cellular One of Galveston Galveston, Texas (409) 783-7000	Galveston, Texas/System A	State of Texas (charged home peak rate)	Basic Plan/$25 installation; $35 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, 7 p.m. to 7 a.m. Mon.-Fri., 7 a.m. to 12 a.m. Weekends; Late night, 12 a.m. to 7 a.m. every day	Peak, $.39; Off-peak, $.20; Late night, $.05; With 1-year contract: Peak, $.35; Off-peak, $.18; Late night, $.05; With 2-year contract: Peak: $.31; Off-peak, $.18; Late night, $.05	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	No	No	No		$2 installation; $.50/min
St Louis													
Cybertel Cellular Telephone Co. St. Louis (314) 423-6500	Alton, Ill., Granite City, Ill., St. Louis/System A	No	Economy Service/$0 installation; $10 monthly	Peak, 7 a.m. to 8 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.50; Off-peak, $.30	None for less than 31 sec, billed airtime rate for 31 sec and above	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes, part of CF; TPC, Yes	Local only	No	Yes	Off-peak package, $6 a month for 300 min of off-peak calling	$2 installation; $.50 monthly
Southwestern Bell Mobile Systems St. Louis (314) 821-9999	Alton, Ill., Granite City, Ill., St. Louis/System B	No	Economy Plan/$15 installation; $10 monthly	Peak, 7 a.m. to 8 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.50; Off-peak, $.30	None for less than 31 sec, billed airtime rate for 31 sec and above	Send supervision	CW, Yes; CF (3), Yes; NA/BT(3), Yes, part of CF; TPC, Yes	Local only; inbound only; outbound only; hot line	Follow Me Roaming	Yes	Network Speed Calling	$0 installation; $.34/min peak, $.22/min off-peak
Miami													
Cellular One McCaw Communications, Inc. West Palm Beach, Fla. (407) 833-1111	Fort Lauderdale, Fla., Miami, West Palm Beach, Fla./System A	No	Copper Plan/$40 installation; $20 monthly	Peak, 6 a.m. to 8 p.m. Mon.-Fri.; Off-peak, all other times	All times, $.60	None for less than 60 sec, billed airtime rate for 60 sec and above	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Yes, within Florida	Yes	Multi-Phone Detailed Billing	$2 installation; $.60/min
BellSouth Mobility, Inc. Miami (404) 847-3600	Fort Lauderdale, Fla., Miami, West Palm Beach, Fla./ System B	No	Standard Plan/$40 installation; $35 monthly	Peak, 7 a.m. to 10 p.m. every day; Off-peak, all other times	Peak, $.39; Off-peak, $.24	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT(3), Yes; TPC, Yes	Inbound only; outbound only; hot line	Follow Me Roaming	Yes		$2 installation ($0 for BellSouth customers); $.65/min
Pittsburgh													
Cellular One McCaw Communications, Inc. Pittsburgh (412) 471-4400	Johnstown, Pa., Pittsburgh/ System A	Stuebenville, Pa., Altoona, Pa., Youngstown, Ohio, Wierten, W.V., Wheeling, W.V.	Multi-User Level 1, 3-9 phones/$30 installation; $31 monthly	Peak, 7 a.m. to 9 p.m.; Off-peak, all other times	Peak, $.47; Off-peak, $.27	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only; CGSA only	No	Yes		$2.50 installation; $.75/min
Bell Atlantic Mobile Systems Pittsburgh (201) 953-2200	Pittsburgh/ System B	All roaming agreements are for $.99/min, no daily charge	Monthly Value Plan #2/installation fees: 1 phone, $40; 2-9 phones, $25; 10-24 phones, $15; 25+ phones, $0; monthly fees: 1-2 phones, $35; 3-9 phones, $33; 10-24 phones $17; 25+ phones, $16	Peak, 7 a.m. to 9 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.49 for 1-9 phones, $.38 for 10-24 phones, $.36 for 25+ phones; Off-peak, $.29 for 1-9 phones, $.17 for 10-24 phones, $.16 for 25+ phones	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	No	Yes		$2 installation; $.65/min
Independent Cellular Network Altoona, Pa. (814) 944-3011	Altoona, Pa., Johnstown, Pa./System B	State College, Pa.	Best Choice Annual Plan # 12, requires annual contract/ installation fees: 1 phone, $40; 2-9 phones, $25; 10-24 phones, $15; 25+ phones, $0; monthly fees: 1-2 phones, $33; 3-9 phones, $31; 10-24 phones, $17; 25+ phones, $16	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; Off-peak, all other times	Peak, $.47 for 1-9 phones, $.38 for 10-24 phones, $.36 for 25+ phones; Off-peak, $.27 for 1-9 phones, $.17 for 10-24 phones, $.16 for 25+ phones	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	No	No	Yes		$2 installation; $.65/min
Minneapolis													
Cellular One McCaw Communications, Inc. Minneapolis (612) 831-3531	Minneapolis/ System A	Rochester, Minn.	Basic Plan/$35 installation; $19.95 monthly	Day, 6 a.m. to 7 p.m. Mon-Fri; Evening, 7 p.m. to 9 p.m. Mon-Fri; Weekends, 7 a.m. to 7 p.m.; Late night, 9 p.m. to 6 a.m. Mon-Fri; Weekends, 7 p.m. to 7 a.m.	0-100 min, $.55; 101+ min, $.35; Evening/Late night 0-100 min, $.30; 101+ min, $.25	None	Send supervision	CW, Yes; CF (3)**, Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	No	Yes	Directory listing	$2 installation; $.45/min peak; $.27/min off-peak

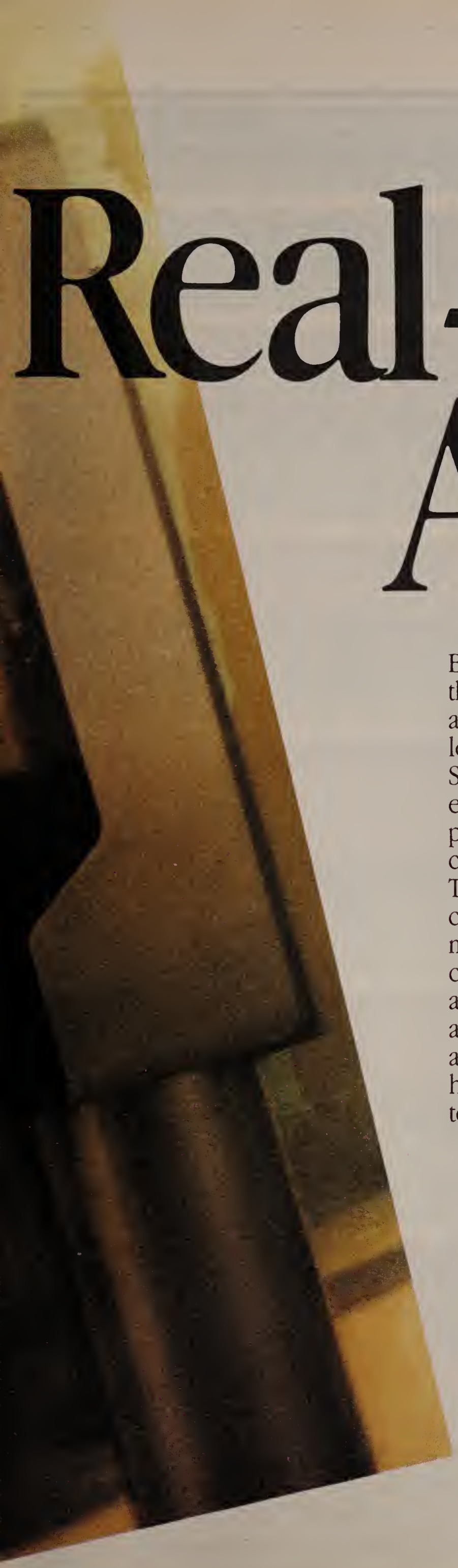
CF = Call forwarding
CW = Call waiting
NA = Information not available
NA/BT = No answer/Busy transfer
TPC = Three-party conferencing

* Unless otherwise noted, carriers bill in one-minute increments.
** See page 48 for explanation of numbers in parentheses.

The information in this chart was provided by the service providers listed. Questions about chart listings should be directed to the individual providers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.





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You and Your Local Phone Companies

AT&T
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Cellular services — top 20 metro areas (continued on page 48)

Company	Areas covered/ System type	Extended area, allied providers	Basic service plan/Service fees	Time periods	Usage rates*	Charges for unanswered calls or busy	Company billing policy	Service options	Call restriction options	Call following	Voice-messaging options	Other options	Visitor rates*
Minneapolis													
US West Cellular Brooklyn Park, Minn. (612) 493-3200	Minneapolis/ System B	All US West mobile systems cities	Basic Plan/$25 installation; $34.95 monthly; $29.95 monthly with 1-year contract	All hours peak	0-15 min, $0; next 100 min, $.20/30 sec; next 200 min, $.18/30 sec; next 200 min, $.16/30 sec; 515+ min, $.15/30 sec	None	Send supervision	CW, Yes; CF (3)**, Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only; outbound-specific number calling only	Follow Me Roaming	Yes	Directory listing	$2 installation; $.60/min; no daily fee for US West subscribers
Cleveland													
Cellular One Northern Ohio Cellular Telephone Co. Brooklyn Heights, Ohio (216) 351-1000	Akron, Ohio; Canton, Ohio; Cleveland, Ohio; Elyria, Ohio; Lorain, Ohio/ System A	Most of Ohio	Service I, Executive Service Fees/$24.95 installation; $34.95 monthly	Peak, 8 a.m. to 8 p.m., Mon.-Fri.; Off-peak, all other times	Peak, $.35; Off-peak, $.20	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Yes; Local only; Inbound only; Outbound only	No	Yes		$2.50 installation; $.75/min
GTE Mobilnet Cleveland (216) 621-8061	Akron, Ohio; Canton, Ohio; Cleveland, Ohio; Elyria, Ohio; Lorain, Ohio/System B	All of Ohio B system	Basic option/$25 installation; $30 monthly	Peak, 7 a.m. to 7 p.m., Mon.-Fri.; Off-peak, all other times	Peak, first 500 min, $.36; next 1,500 min, $.33; over 2,000 min, $.29; Off-peak, $.20	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Yes; Local only; Inbound only; Outbound only	Follow Me Roaming	Yes		$2 installation; $.50/min; GTE Mobilnet subscribers pay home peak rates only
Atlanta													
PacTel Cellular Norcross, Ga. (404) 449-3900	Athens, Ga.; Atlanta/System A	No	Low User Rate Plan/$40 installation; $40 monthly; allowance, 60 min	Peak, 7 a.m. to 8 p.m. Mon.-Fri.; off-peak, all other times	All penods, $.60	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; U.S. only	No	Yes, Mobile Messenger	No	$0 installation; $.45/min
BellSouth Mobility, Inc. Atlanta (404) 847-3700 (800) 351-3355	Athens, Ga.; Atlanta/System B	Macon, Ga.	Standard Plan/$40 installation; $35 monthly	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; off-peak, all other times	Peak, $.35; off-peak, $.25	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; Inbound only; outbound only; outbound-specific number calling only	Follow Me Roaming	Yes, Mobile Memo Service standard		$2 installation; $.60/min (no daily startup fee for BellSouth customers)
San Diego													
US West Cellular San Diego (206) 747-4900	San Diego/ System A	All US West mobile systems cities	Monthly agreement/$35 installation; monthly fees: 1 phone, $35; 2-7 phones, $33; 8-23 phones, $30; 24-49 phones, $27; 50+ phones, $26.60	Peak, 7 a.m. to 7p.m. Mon.-Fri.; off-peak, all other times	Peak, 0-180 min, $.40; 181+ min, $.35; off-peak, $.20; discounts: 2-7 phones, 3%; 8-23 phones, 5%; 24-49 phones, 6.5%; 50+ phones, 7.5%	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Inbound only; outbound only	Easy Roaming	Yes		$0 installation; $.60/min; no daily fee for US West subscribers
PacTel Cellular San Diego (619) 535-6400	San Diego/ System B	No	Business Plan/$40 installation; monthly fees: 1 phone, $35; 2-7 phones, $33; 8-23 phones, $30; 24+ phones, $27	Peak, 7 a.m. to 7 p.m. Mon.-Fri.; off-peak, all other times	Peak, 0-200 min, $.40; 200+ min, $.36; off-peak, 0-200 min, $.20; 200+ min, $.18; discounts: 2-7 phones, 3%; 8-23 phones, 5%; 24+ phones, 7%	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only; outbound-specific number only	Follow Me Roaming	Yes		$0 installation; Peak, $.60/min; Off-peak, $.24/min
Denver													
Cellular One McCaw Communications, Inc. Denver (303) 831-5500	Colorado Springs, Denver, Fort Collins, Colo., Greeley, Colo./System A	No	The FairAir Rate Plan/$25 installation; $25 monthly;	Peak, 7 a.m. to 8 p.m. Mon.-Fri.; off-peak, all other times	Peak varies ($.54 to $.30); Off-peak varies ($.25 to $.20)	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; Inbound only; outbound only; outbound-specific number only; international restriction	Yes	Yes, Message Manager, Message Manager Plus, link with paging system	No	$2 installation; $.60/min
US West Cellular Englewood, Colo. (206) 747-4900 (303) 790-1600	Colorado Springs, Denver, Fort Collins, Colo., Greeley, Colo./System B	All US West mobile systems cities	Standard agreement (month-to-month), Optimum Plan/$25 installation; monthly fees: 1 phone, $25.95; 2-9 phones $24.95; 10+ phones, $23.95	Peak, 6 a.m. to 7 p.m. Mon.-Fri.; off-peak, all other times	Peak varies ($.58 to $.38); off-peak varies ($.31 to $.19); discounts: 1 phone, 0%; 2-9 phones, 15%; 10+ phones, 17%	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; outbound only	Easy Roaming	Yes, Message Center, Message Center Alert	Directory listing/ unlisting,	$2 installation; $.60/min; no daily fee for US West subscribers
Seattle													
Cellular One McCaw Communications, Inc. Seattle (206) 284-5555	Bremerton, Wash., Olympia, Wash., Seattle, Tacoma, Wash./ System A	Spokane, Wash., Yakima, Wash., Eugene, Ore., Medford, Ore., Boise, Idaho	FairAir (1 phone), FairAir Plus (2-8 phones), FairAir Gold (9+ phones)/ $25 installation; monthly fees: 1 phone, $24.95; 2-8 phones, $19.95; 9+ phones, $14.95	Peak, 6 a.m. to 8 a.m. Mon.-Fri.; off-peak, all other hours	Peak, varies ($.57 to $.28); off-peak, varies ($.20 to $.16)	None	Answer supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Local only; inbound only; outbound only	Wide receiver	Message Manager, Message Manager Plus	Wide Receiver	$2 installation; peak, $.45/min; off-peak, $.27/min; no daily fee for McCaw subscribers from extended area

CF = Call forwarding
CW = Call waiting
NA = Information not available
NA/BT = No answer/Busy transfer
TPC = Three-party conferencing

* Unless otherwise noted, carriers bill in one-minute increments.
** See page 48 for explanation of numbers in parentheses.

The information in this chart was provided by the service providers listed. Questions about chart listings should be directed to the individual providers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

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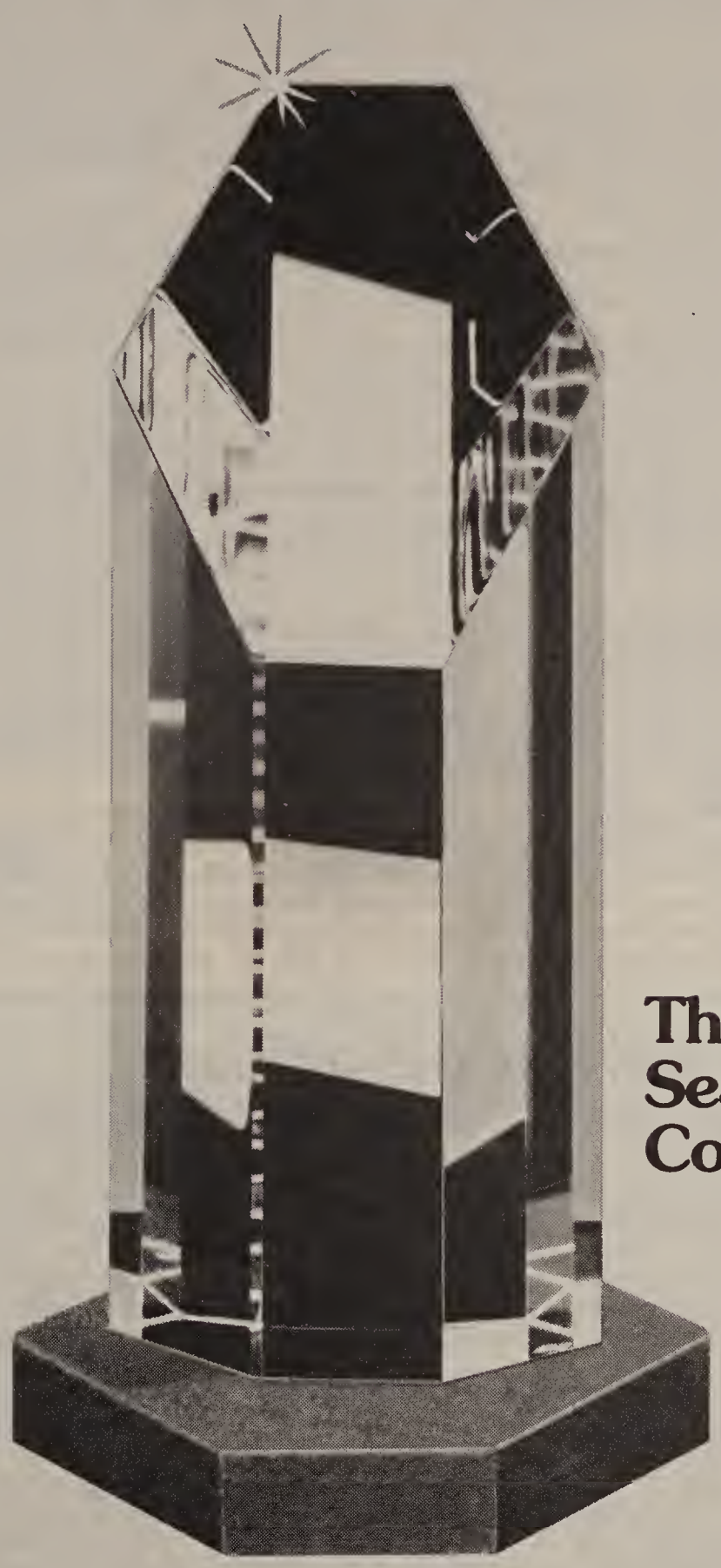

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Cellular services — top 20 metro areas (continued from page 46)

Company	Areas covered/ System type	Extended area, allied providers	Basic service plan/ Service fees	Time periods	Usage rates (per minute)	Charges for unanswered calls or busy	Company billing policy	Service options	Call restriction options	Call following	Voice-messaging options	Other options	Visitor rates (per minute)
Seattle cont'd													
US West Cellular Bellevue, Wash. (206) 455-2656	Bremerton, Wash., Olympia, Wash., Seattle, Tacoma, Wash./ System B	All US West mobile systems cities	Month-to-month, Optimum Plan/$25 installation; monthly fees: 1 phone, $34.95; 2-9 phones, $29.95; 10+ phones, $21.95	Peak, 6 a.m. to 7 p.m. Mon.-Fri.; off-peak, 7 p.m. to 6 a.m. Mon.-Fri.; weekend, 12:01 a.m. Sat. to midnight Sun.	Peak varies ($.51 to $.37); off-peak varies ($.32 to $.24); weekend, $.20; discounts, 1 phone, 0%; 2-9 phones, 5%; 10+ phones, 10%	None	Send supervision	CW, Yes; CF (3), Yes; NA/BT (3), Yes; TPC, Yes	Yes	Easy Roaming	Message Center, Message Attention	Directory listing/ unlisting	$2 installation; $.60/min; no daily fee for US West subscribers

CF = Call forwarding
CW = Call waiting
NA = Information not available
NA/BT = No answer/Busy transfer
TPC = Three-party conferencing

FOOTNOTES FOR NUMBERS IN PARENTHESES:

1. Cellular One of Chicago offers a "Feature Combination" package that bundles call transfer (call forwarding on busy/no answer), call waiting and three-party calling for one $5 per month charge.
2. Cellular One of Chicago doesn't charge an installation fee for features if ordered at the time of initial installation. However, subsequent changes are subject to a $15 activation fee.
3. Long-distance usage rates apply for forwarded or transferred calls.
4. Ameritech has discount packages for features: $2 per month for each feature; $5 per month for three features and $7 per month for all four features. Ameritech also combines its VIP rates, voice-messaging and paging services into a Value Pack, which is $19.95 per month for the standard package and $24.95 for the enhanced package.
5. Ameritech offers a Ten Cent Option for off-peak calling that may be added to VIP, Time Pack, Value Pack or Lease Pack services for an extra $20 per month. Rates are equal to off-peak Ten Cent Plan rates.
6. Ameritech has discount packages for features: $2 per month for each feature, $3.50 per month for three features and $4.50 per month for all four features. Ameritech also combines its VIP rates and voice-messaging service into a Value Pack, which is $34.95 per month for the standard package and $39.95 for the enhanced package.
8. Custom Calling Features provided with services: Introductory, 1 free; Standard, 2 free; Super Saver, 3 free; Business Discount and Corporate Flex, 4 free.
9. Waived for associated cellular company customers — Metro One in New Jersey, Metrophone in New Jersey, Cellular One of Atlantic City and Cellular One of Wilmington.
10. Cellular One offers a feature package price for all features listed with this footnote.
11. Price shown is total package price for all features listed with this footnote.
12. All features are available in a feature package at $10 per month.
13. Call forwarding and no answer/busy transfer come in a packaged priced at $3 per month, $2.50 for multiuser plans. Call waiting and three-party conferencing plus the basic package costs $8 per month, $6 for the multiuser plans.
14. Call forwarding, call waiting and conference calling are available as a package for $8.
15. All features are available in a feature package at $8 per month.
16. Feature packages are available at $6 for 2 features, $8 for three features and $10 for 4 features.
17. Feature packages are available at $9 for 3 features or $12 for 4 features.
18. No answer transfer and busy transfer are considered separate services, and each cost $3.25 per month.
19. There is a $.10 surcharge for local calls terminated to land line telephone numbers.
20. All features free for 1 year; after 1 year, 1 feature costs $2, 2 features cost $3, 3 features cost $4, 4 features cost $7, 5 features cost $8.
21. The first feature is $2.50 per month; each additional feature is $1.25 per month.
22. If combined peak and off-peak usage is less than or equal to 180 mins. per month, then peak is billed at $.40/min. Otherwise all peak time is billed at $.35/min.
23. First feature costs $2.50 per month; each additional feature costs $1.25 per month.
24. Call feature package includes call waiting, call forwarding, three-party conferencing and detailed billing for $6 per month.
25. Two-feature package costs $6; three features cost $8; four cost $10.
26. All five features are available for $8 as a package.
27. No answer and busy transfer are considered different services. Each cost $2.
28. Call forwarding, no answer transfer, call waiting and call conferencing are packaged together at $4.50 per month.
29. Transmits single recorded message to a preselected list of mobile secretary subscribers. Useful for companies for sending messages to groups of people.
30. All four features are offered as a package for $4.50 a month.

The information in this chart was provided by the providers listed. Questions about chart listings should be directed to the individual providers or to TeleChoice at (203) 645-0471.

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 39)
lar phone is in use or not activated. Among the many options available, voice mail lets users record, retrieve, send, edit, prioritize and transfer voice messages. Users can also personalize outgoing messages, passwords, even voice signatures with these voice mail systems. The cost typically ranges between $4 and $10 per month, depending on whether a user gets the basic or enhanced service.

■ **Call waiting.** This is the same as its local exchange counterpart. Only two calls at any particular time can be sent to a phone. All other calls receive a busy signal or are forwarded to voice mail or another number.

■ **Call forwarding.** This feature often includes the ability to forward all calls or just the calls that come in when the phone is in use or unanswered. What's more, these features can be used interactively. For instance, users who have both call waiting and call forwarding/no answer can choose not to answer the call waiting signal and let the call be forwarded to another number — often the voice mailbox.

■ **Three-party conferencing.** This allows users to add a third party to the call.

■ **Data services.** These provide data transmission service when coupled with a laptop computer, facsimile machine or other data transmission device.

■ **Accounting codes.** These allow users to segment their monthly bill among different clients, simplifying end-of-the-month cost allocation.

Calling when away

Another major factor in evaluating cellular services is how different carriers handle calling outside the local calling area. As the U.S. becomes covered by cellular service areas, users traveling from one zone to the next will want to have more transparency in the process.

Changing zones today is a tricky task because of overlapping coverage areas and differing

(continued on page 54)

A list of cellular definitions

A Block/B Block — The two sets of channels assigned by the government to the two cellular telephone companies operating in each metropolitan area.

Airtime — The amount of billable time a user has accumulated, usually in minutes.

Cellular geographic service area — The metropolitan area, composed of one or more counties, in which a cellular phone company is authorized to operate.

Crosstalk — The sound of two simultaneous conversations on a cellular system.

Dead spot — An area within a cellular system where service is not available.

Electronic serial number — The unique identifying number of a cellular telephone that has been embedded in its circuits by the manufacturer.

Follow Me Roaming — A service provided by GTE Mobilnet software that allows cellular users to receive calls made to their cellular telephones when they're in another city.

Handoff — The transfer of a cellular conversation from one voice channel to another.

Home carrier — The cellular telephone company with which a user's telephone is registered and to which the user pays monthly access charges.

Improved Mobile Telephone Service — The mobile telephone service available in 2,000 U.S. and Canadian cities since the 1960s. It is not compatible with cellular service.

Non-wireline — Description of a company operating the A Block of cellular channels.

Roamer access number — An area code and seven-digit number that allows users to receive calls when they are outside their home service areas. A caller dials the roamer access number where the subscriber is located, waits to hear a tone, then dials the area code and number of the cellular phone.

Crosstalk — two conversations on a cellular system.

▲▲▲

Roaming agreement — An agreement between two cellular telephone carriers to accept the calls of each other's users. Users are billed by their home carrier for any calls they place on the host carrier and any applicable daily fees.

RoamingAmerica — A service provided by Appex Cellular Information Management that allows cellular users to receive calls made to their cellular telephones when they're in another city.

Super Access — A service that enables certain cellular users to receive calls made to their cellular telephone numbers when they are outside their home service areas.

Wireline — Description of the company operating the B Block of cellular channels.

Source: *The Cellular Telephone Directory,* Communications Publishing Service, Mercer Island, Wash.

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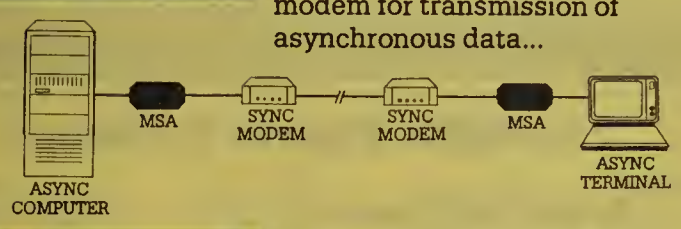

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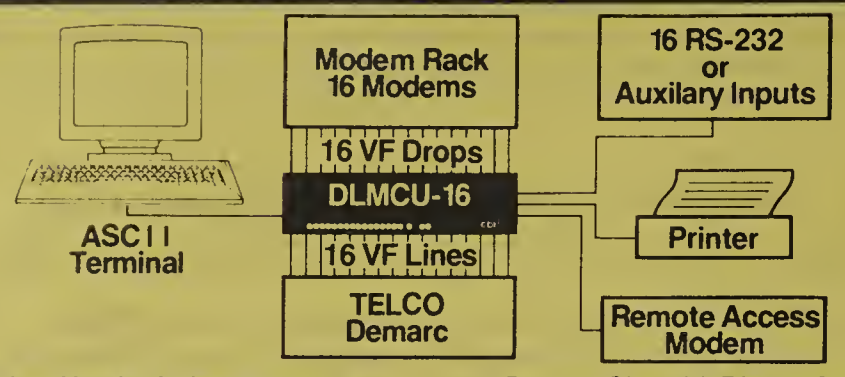

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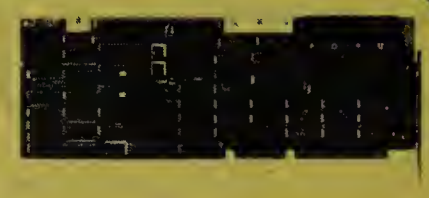

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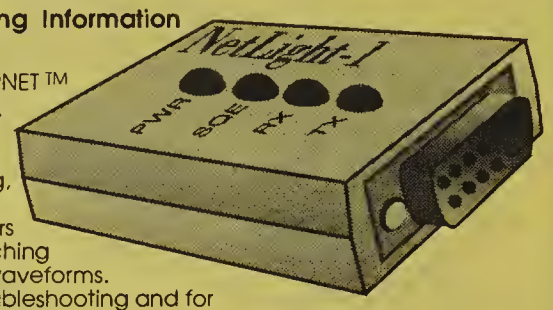

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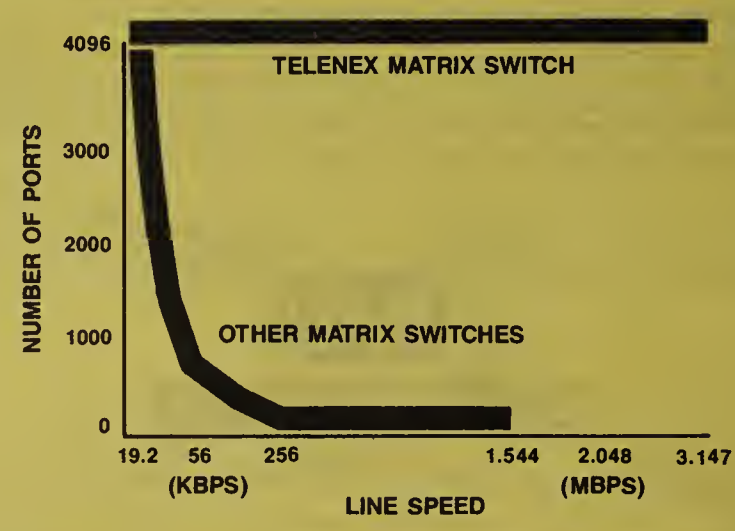

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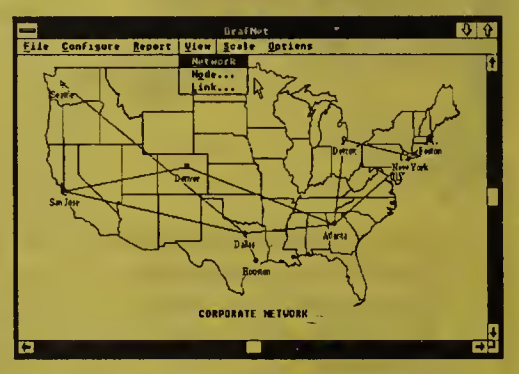

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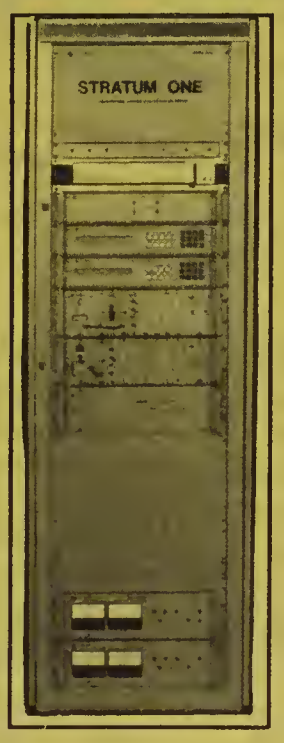

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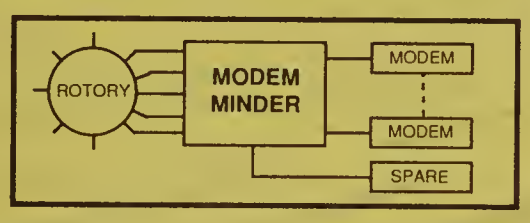

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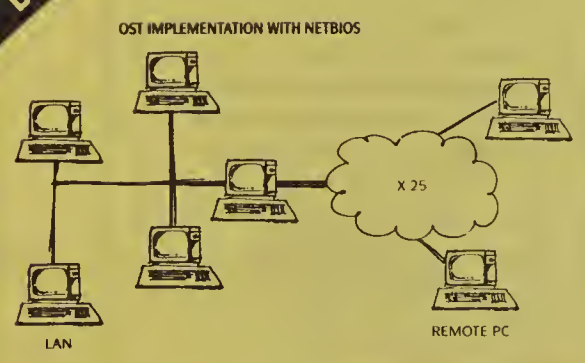

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(continued from page 48)
service arrangements. Moving from one cell to another within the home carrier's territory is usually no problem, outside of occasional fading and overlapping conversation at cell edges.

However, changing carrier zones is a more complicated process. Typically, a light on the phone will indicate that the user has left the home carrier calling area. Therefore, when in another carrier's territory, the user may have to follow any of a number of procedures to make a call.

Many neighboring carriers are becoming partners or signing mutual handling agreements with neighboring cellular providers to form wide-area networks. These carriers can market their basic service to a broader coverage area, seamlessly providing users with hassle-free calling.

For instance, Cellular One of central New Jersey has formed alliances with Metro One/Cellular Telephone to the north, Metrophone directly to the west, and Cellular One of Atlantic City, N.J., and Cellular One of Wilmington, Del., in the south to offer a wide-area plan that covers all of those areas at one price on the local system, resulting in no foreign billing and no daily sign-on fees.

Users who are not in an area with such extended service may receive calls in one of four general manners. The most generic method is through roamer numbers — access numbers that allow callers to enter the local market and attempt to reach another subscriber that is traveling in the area at the same time.

The caller dials the roamer number, hears a tone or beep, then enters the subscriber's telephone number. If the subscriber has logged onto the local network, that call will then be completed. The caller pays for all long-distance fees; the subscriber pays for all airtime and daily setup charges.

A second manner in which users can receive calls when on the road is through Follow Me Roaming. This is offered by GTE Mobilnet through many cellular providers on System B across the country. With Follow Me Roaming, all calls are forwarded automatically to subscribers wherever they may be on the road.

The user activates Follow Me Roaming by dialing a series of numbers on the telephone keypad, telling the system to register the user on that system. Then all calls will be forwarded to the user — at the user's expense.

Unlike other carriers, GTE Mobilnet provides its subscribers with the option to selectively activate Follow Me Roaming in a foreign area because some users may not want to receive all calls automatically. This gives users the option of telling only a few specific people the roaming number where they may be located.

GTE automatically deactivates Follow Me Roaming at midnight each day, or users may do so manually at their convenience. Users must reactivate the service each day. Currently, Follow Me Roaming is available in more than 300 markets in the U.S. and Canada.

A third roaming system is RoamingAmerica, provided by Appex Cellular Information Management of Waltham, Mass. The service is predominantly for System A users.

RoamingAmerica operates similarly to Follow Me Roaming, but it also provides caller notification services. Caller notification allows users to have incoming calls conditionally transferred to a voice announcement on the home switch.

The announcement tells the calling party what city the user is in and provides calling instructions, including the long-distance phone number for the foreign switch's roamer access port number. This passes the long-distance charges on to the caller.

RoamingAmerica users automatically activate call following by placing a call from any roamer market. The user does not have to manually activate the system using the telephone keypad, although that option exists.

Like Follow Me Roaming, RoamingAmerica detects calls and sends activation requests to Appex's main computer system. When the system receives these activation requests, it sends a sequence of commands to the home and roam switches to deliver the subscribers' calls to their current location.

When RoamingAmerica users turn off the service, it automatically resets to the home voice mail features so they won't lose any calls or messages. Follow Me Roaming users would have to call long distance into their home area to reset voice mail features.

Later this year, Appex plans to offer confirmation calls to the subscriber in the foreign area noting that the phone is properly registered in the new market area.

RoamingAmerica will continue forwarding calls until the caller returns to the home service area. If the service is not deactivated, automatic cutoff occurs 24 hours after the last call made in the foreign market.

Appex said it expects to have RoamingAmerica in more than 200 North American markets by March 1. Appex's RoamingAmerica service is also offered by McCaw Cellular Communications, Inc.-owned cellular service providers under the product name Nation Link.

A fourth manner to receive calls is through Super Access, which is offered by Cellular One in several areas of California. This service is primarily for System A customers.

Super Access automatically registers users when they place their first call in a foreign area. Users can also activate call forwarding at their own expense using the phone keypad. Some Super Access users also have caller notification: Once they make a call on the system, a message is sent to the home switch letting it know where to reach them. These instructions include the roamer access code and dialing information.

Whether users choose a System A or System B roaming service is usually determined by the type of system they have at home. A user who has System A at home will likely use System A on the road. However, this does not necessarily have to be the case. By shopping around for a roaming service when traveling, the user can realize some substantial savings.

A book that helps

One publication, *The Cellular Telephone Directory* (Mercer Island, Wash.: Communications Publishing Service, $14) provides a complete listing of all visitor rates in the U.S. and select foreign countries. It also gives instructions on how to set up service and access systems.

Cellular telephony is by no means perfect. One often-stated problem is invasion of privacy. It is possible to tap into cellular communications with off-the-shelf devices. However, someone would have to go to great lengths to accomplish this. As phone users move from one cell to another, the conversation is switched randomly from channel to channel, making it difficult to follow.

In addition, it's illegal to tap a cellular phone conversation, according to the 1986 Electronic Communications Privacy Act. But it's possible, so when using a cellular phone, watch what you say and where you say it. Most user firms publish a code of usage in which confidential information is barred from cellular transmission.

Cellular telephony is by no means perfect.

▲▲▲

Bell Atlantic Corp. has an option on its system in Washington, D.C. designed to squelch any privacy problems in its territory. Users can purchase a data encryption device that attaches to their cellular phone. The device scrambles communications between the mobile unit and the switching office, making eavesdropping nearly impossible.

Another problem with cellular telephony is the invasion of personal privacy. As cellular phones become an accepted way of life for senior management, it becomes difficult for employees to say no when asked to keep in touch constantly with the office by using a car phone.

To many, this creates the feeling of not being able to get away from the office, which can have a profound effect on their performance when they're actually in the office.

According to many industrial psychologists, the best solution is for companies to avoid putting employees in a situation where they are carrying a phone around 24 hours a day.

What the future holds

Nonetheless, the future of cellular telephony is assured, if for no other reason than that people are becoming addicted to having such universal access to communications. However, as usage soars, technology will have to fight to keep up.

Congestion is a major problem that cellular companies will have to deal with in the near future. Los Angeles is already running into capacity problems in some areas, and it expects to hit a capacity

(continued on page 58)

Evaluating cellular services

Some not-so-obvious factors to look for when evaluating cellular services are:

- **Rate periods.** Are there peak and off-peak hours, or day, evening, late night and weekend periods? What are the rate periods? Does one cellular service provide longer off-peak periods than another?
- **Customer service.** Is there a 24-hour customer service line? Is it manned 24 hours per day, or is someone paged after regular working hours?
- **Call detail.** Is call detail free, or will there be an extra charge for it?
- **Billing increments.** Are calls rounded to the next higher minute, or is there 30- or 6-second billing?
- **Answer supervision.** Are calls billed when the called party answers or from the time you hit the SEND key on your phone? Depending on the billing assumptions of the carrier, the extra cost of services that bill on SEND may wipe out any savings due to 6-second billing!
- **Unanswered and busy charges.** Are there charges for unanswered or busy calls? Some carriers will charge you for the airtime it takes to ring your phone in your car.
- **Call following.** Is there automatic call following when you travel? Or does someone have to find you by dialing roaming numbers?
- **Extended calling areas.** Has the carrier forged alliances with neighboring carriers to form extended calling areas? Such alliances can mean lower costs for people who travel great distances.
- **Directory assistance.** Do you automatically get a directory assistance listing, or does that cost extra?
- **Calling restrictions.** Does the service have any calling restrictions available? Managers can cut down on abuse by limiting the extent to which users can make calls. Allowing users to make outgoing calls only to a specific number is a popular item for companies that want users to call back only to the home office.

Free bonus services

In an effort to not only enhance their products, but also to differentiate their products from competitors', some carriers are offering free bonus services. Among the more creative ones currently offered are:

- **Star*Jam.** Provided by Los Angeles Cellular Telephone Co., this is a personalized traffic routing service that helps drivers avoid traffic jams. By dialing "*JAM," users can reach a live operator who will help them find a way out of any traffic mess.
- **Traffic Solutions.** Provided by MetroCel Cellular Telephone Co. in Dallas, this service provides users with traffic reports customized for the area in which they're driving. These reports are updated every 15 minutes.
- **Star*Find.** Provided by Los Angeles Cellular, this cellular Yellow Pages helps users locate a particular business in an unfamiliar neighborhood.
- **Mr. Rescue.** This includes free emergency roadside service provided by some GTE Mobilnet systems. By pressing "*HELP," a 24-hour-a-day, seven-day-a-week professional service technician will be out to help you within 30 minutes.

In addition, many cellular systems allow users to look up sports scores, stock quotes, and even buy amusement and entertainment tickets — all through the cellular phone interface.

When you add all of these features together with the latest cellular phone technology, the result is a mobile office. Users can tie telephones, facsimile machines and modems into home offices, creating a communications link that increases effectiveness and boosts productivity.

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The right choice.

(continued from page 54)
brick wall by early 1991. Congestion causes degradation in conversation quality; crosstalk is common.

One solution is to multiplex individual channels to increase capacity. In late 1989, PacTel Cellular, based in San Francisco, and Qualcomm, Inc., based in San Diego, previewed their Code Division Multiple Access (CDMA) digital cellular system, which has the potential to provide a 20-fold increase in the capacity of the available transmission spectrum.

With existing cellular technology, every call is assigned a single voice channel. Under CDMA, multiple calls are spread across the same segment of spectrum through a multiplexing-like technology. A CDMA cell has the potential to provide more than 1,200 voice channels, as opposed to the 57 channels available in today's cells.

In addition to increased capacity, CDMA has a number of side benefits: increased transmission and reception capability, fewer cell sites and enhanced voice quality. Since CDMA requires less transmission power, battery life is prolonged, giving users greater use of existing equipment.

Initial tests by PacTel Cellular have been successful, and the carrier also has noted improved user-transparent call handoff from cell to cell.

Other technologies besides cellular that could also significantly bolster personal telephony are on the horizon. The next generation of cellular phones is under development, and leading cellular providers have asked the Federal Communications Commission for a market review to assess where the industry is heading and how frequencies will continue to be allocated among the different technologies.

One of the more interesting futuristic products is under development by GTE Laboratories, Inc. in Waltham, Mass., which uses Portable Access Locations. This technology uses a compact phone unit that homes off of small, fire detector-sized transceivers. These transmitting devices have smaller footprints — generally covering an area the size of a large room — than their cellular counterparts, thereby requiring less power. They are not designed for use in cars moving at high speeds on a highway, but rather for use in a hotel, resort or convention center setting.

What is most alluring about these phones is that no one carrier controls a large area. The small coverage area allows companies to set up small networks for collecting and sending calls on their own. Thus, a hotel or resort could set up a network of 200 or so detectors and issue personal phones to all registered guests for use in the room, in the restaurant, on the golf course or even in the hot tub. The hotel could run the calls through its own long-distance network. In the end, cellular technology will become more a part of everyday life for all of us.

There has been a lot of kidding lately about Dick Tracy telephones and fax machine belt buckles. The funny thing is that these devices don't sound quite so outlandish anymore. Telephone users of the near future may have one telephone number where they may always be reached — whether on the road, in the office, on a boat or even on an airplane.

The telecommunications industry is changing rapidly, and the cellular segment is determined not to be left behind.

Because of space limitations, the charts accompanying this article include only a single service for each carrier listed. A complete listing of the cellular services offered by all carriers in the top 20 markets is available from TeleChoice at (203) 645-0471.

Safety tips for cellular users

Doing two things at once is not always best, particularly when one of them is driving a car. Be sure that your company has a safety policy regarding driving while talking on the cellular phone. Among the items to include in that policy are:

- **Use speed-dial buttons.** For frequently dialed numbers, program speed-dial buttons. The less time you are looking at your handset, the more time you can pay attention to the road.
- **Dial slowly.** Don't feel the need to dial all of the digits at once. Pause after every few digits to reassess the road conditions.
- **Check out traffic conditions.** Before placing or answering calls, be sure that the traffic is not so chaotic that it will make driving and talking difficult.
- **Wait for good dialing situations.** There are better times to dial than others — for example, when stopped at a light, driving on a clear highway or parked in a lot. Merging into traffic and approaching a toll booth are not good times to dial.
- **Obey all traffic signs prohibiting cellular communications; they're there for a reason.** If the sign says, "Blasting ahead, turn off cellular phones," it is because certain frequencies can set off explosives. Obey these signs at all times.
- **Disconnect, then jump start.** If you need to jump start your car, disconnect your phone at the transceiver. Otherwise, you could fry your phone and your warranty will not cover the damage.
- **Don't advertise.** When leaving your car in a parking lot or other public place, don't leave your transportable telephone on the seat. It's an invitation for theft. Put it in the trunk or somewhere out of sight.

— Daniel Briere

FAXNeT is a service designed to help readers of *Network World* gather important information via FAX on products and services advertised in *Network World*.

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New options muddle net

continued from page 1

"The process of optimizing a network for cost has become mind-numbing," said Glenn Miller, telecommunications strategic planning manager for the Upjohn Co., a pharmaceutical conglomerate in Kalamazoo, Mich. "It requires a tremendous amount of time and skill."

Nonetheless, users press on. Upjohn has optimized its voice network for cost four times in the past eight years, reducing its cost per minute from more than 30 cents in 1982 to less than 13 cents today.

Upjohn moved from a private-line network to a tandem "hubbed" network and later to WATS. The company then upgraded to AT&T's Megacom service and has now settled with an AT&T Software-Defined Network (SDN), which serves about two dozen sites and may be expanded to include 300 more, Miller said.

The increasing complexity of network optimization forced Upjohn to add to its in-house engineering expertise. The company hired network engineers away from AT&T and GTE Corp., where they had sculpted networks for large users, Miller said.

"These people know from experience what the network design criteria are, what alternatives are available and which options need to be considered when optimizing networks for cost," Miller said.

The brainpower helped when Upjohn began shopping for network design and optimization tools. "We looked at many software progams that we could lease, access or buy, and became concerned about the expense of acquiring and maintaining a system of our own," Miller recalled.

Upjohn decided instead to combine its in-house expertise with that of a major consultancy specializing in network optimization. Together, they decided the pharmaceutical company should migrate from its Megacom service to SDN, Miller said.

Perhaps the most controversial method of optimization is turning the problem over to a carrier under customer-specific contracts based on off-tariff pricing.

While these deals can provide big savings, there are strings attached. Customers must sign long-term contracts and are, in many ways, constricted by the commitment required to make the pacts work.

Still, users that have taken this approach are convinced of its merits. The Prudential Insurance Co. of America has slashed its costs by securing off-tariff contracts for the bulk of its traffic and playing carriers against one another to get the lowest prices for the remaining traffic. The Prudential had cut its branch offices' average cost per call minute to under 20 cents by conducting continual traffic studies and putting available business up for bid.

The insurance and financial services company had two staff members who used a personal computer-based network design software program to compile more than 200 traffic reports a year, said Neil McAuliffe, senior vice-president for The Prudential. The company does overall traffic studies and studies for newly acquired sites and locations to be expanded.

"We couldn't go any lower without bidding the business on a firmwide network basis," McAuliffe said. So the company ended up doing just that.

Early last year, The Prudential issued a request for proposal for its 250 million minutes of voice and data traffic and provided each of the top carriers with a corporationwide study that broke down traffic by WATS band.

After evaluating an AT&T Tariff 12 proposal and bids from MCI Communications Corp. and US Sprint Communications Co., The Prudential signed a five-year, $200 million Tariff 12 deal with AT&T that brought the average cost per minute down below 13 cents, McAuliffe said.

Under the custom network agreement, AT&T will build, run and maintain a 1,700-site corporate network consisting of a mix of switched and dedicated services. As part of the deal, the company agreed to run a minimum of 75% of its traffic over the net.

"We are locked into Tariff 12, to an extent, but we have [clauses] written into the contract to protect us, and we are free to do what we choose with the other 25% of our traffic," McAuliffe explained.

Staff reductions a mixed blessing

continued from page 2

the bottom to the senior vice-president level from five to four," a Bell Atlantic spokesman said.

Bell Atlantic had expected about 1,200 managers to apply for early retirement incentives. However, 2,200 managers responded to the company's offer, and resignations from 1,683 managers were accepted (see graphic, page 1). The spokesman could not estimate how much the company will save with the staff reduction.

Patrick Springer, director of telecommunications industry services at Telecommunications Management Consultants in Needham, Mass., warned that users may be facing some short-term service problems in the wake of staff cutbacks.

"We're looking at the district manager level and below" for most early retirement and outplacement programs, Springer said. "These are the people who provide service support to clients.

"It will take a while to implement the new lines of communication and control, and users will see some loss of efficiency" over the next six months to one year, he said.

Beyond the first year, Springer said, "you'll see a greater receptiveness to customer requirements." Longtime employees who are used to a different market will, in many cases, be replaced by newer employees who are more open to new ideas.

A shorter chain of command should also speed the decision-making process and hasten the development of new products and services, Springer said.

> "I see capital from staff cuts being funneled into local network upgrades," Boczar said.
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The money funnel

David Boczar, a telecommunications analyst for New Japan International Securities International in New York, projected that the RBHCs will funnel much of the money they save from staff reductions into their networks.

"I see capital from staff cuts being funneled into network upgrades," Boczar said. The RBHCs have an incentive to invest more heavily in the public net because regulatory changes have allowed them to provide new network services, such as information services, that are expected to spur usage of the public net.

Users say money saved by reducing staff should be passed on to customers in the form of lower rates.

But Brian Moir, Washington, D.C. counsel for the International Communications Association, said he does not believe this is likely to happen.

"We've had [cost] reductions like this in the past, and it has not affected user [rates]," Moir said. "And based on historical precedent, I don't see the Federal Communications Commission acting to ensure that lower costs are being pushed through to ratepayers."

The exodus of telephone company managers could be a boon to users looking for experienced network personnel.

Robert Wilkes, a telecommunications analyst at Brown Brothers Harriman & Co., said, "The cuts could provide some needed knowledge at [user companies] about emerging technologies such as Integrated Services Digital Network."

He said that as users spend more money on services, the need is rising for workers who have inside knowledge of the telephone companies.

Peregrine tool gets NetView link

continued from page 6

the product will enable them to be more proactive in responding to network problems because help desk personnel will find out about those problems directly from NetView. That gives the network management team a chance to fix a problem before it affects users.

According to Dennis O'Dell, a programmer at First Interstate Bank of Oregon in Portland, Ore., more than 90% of all trouble tickets for the company's network are currently opened after end users call the help desk.

He said the bank is testing the PNMS3/Netview Interface on an IBM 3090/400S mainframe supporting 7,000 devices at corporate offices and 500 branches.

With the interface, users can define the NetView alerts that should automatically open a trouble ticket without intervention from the help desk operator, O'Dell said. He is now deciding which NetView alerts should trigger that process, but he added that for those tested to date, the system has worked as promised.

"It's been 100% accurate so far" in opening trouble tickets for the proper alerts and transcribing alert data from NetView to PNMS3, which help desk operators don't always do accurately, he said. "It takes the human factor a little bit out of the way."

Terri Cruz, systems support specialist at Merrill Lynch & Co., Inc. in New York, said she expects the interface to help determine where network bottlenecks exist by programming it to open trouble tickets when response time exceeds predefined thresholds.

Cruz plans to install the software this week. She said she expects it will allow the help desk to raise the number of proactive trouble tickets opened from 10% to 40% of the 200 tickets opened each day.

The PNMS3/NetView Interface has two host-based software components, said Clarke Kawakami, product manager at Peregrine Systems. The first runs within NetView as a Data Service Task (DST), which is the IBM name for the various programs — such as Network Problem Determination Aid — that make up NetView. The NetView component uses a published format for accessing NetView alerts from NetView's External Log Task DST, which means it will be compatible with all future versions of NetView, Kawakami said.

Writing code for that format is a complicated endeavor, but the job was handled by Peregrine's John O'Brien, one of the original architects of NetView.

As the NetView component captures alerts, it writes them to a Virtual Storage Access Method (VSAM) file on the host where it can be picked up by the second component, which runs as part of PNMS3, he said. The PNMS3 component consists of code that users can tailor to define what alerts should initiate trouble tickets.

> "It's been 100% accurate so far" in opening trouble tickets for the proper alerts.
>
> ▲▲▲

By contrast, IBM offers a facility for transferring NetView alert data to its Information Management system, but it requires human intervention to determine which alerts should open trouble tickets, Kawakami said.

The PNMS3/NetView Interface is available now. Its introductory price, which will be in effect until March 31, ranges from $15,000 to $62,000, depending on the number of users. After March 31, the price will range from $18,000 to $93,000.

Telecom*USA to buy Allnet

continued from page 4

"Where we're strong, they're not; and where they're strong, we're not," Kaiser said.

Allnet customers also stand to benefit from Telecom*USA's wider range of services and products, Kaiser said. For example, Telecom*USA offers private-line services, whereas Allnet does not.

Mark Dunkel, a vice-president and analyst at Robinson Humphrey Co., Inc., an Atlanta-based brokerage firm, said he is optimistic about the deal.

"Allnet customers are going to gain access to a whole new array of products, including operator services and nationwide 800 services," Dunkel said. "Telecom*USA customers won't see much of a change right away."

But in the long run, the acquisition will make Telecom*USA stronger, he said. "Telecom*USA doesn't want to get caught between being a regional carrier and a national carrier," Dunkel said. "They're making a statement that they are a national carrier."

William Oberlin, Allnet's vice-president of marketing and sales, agreed, but he stressed that both Telecom*USA and its ALC subsidiary will maintain a regional approach within the national carrier framework.

"We must continue to provide a personal customer service approach," Oberlin said. "Whereas the big carriers provide the same service in New York that they provide in Seattle, we take into account different calling patterns in the two cities and adjust our services accordingly."

Kodak turns nets over to IBM, DEC

continued from page 1

The majority of net operations will be turned over to DEC, which will manage Kodak's international voice network and a range of data networks — a large percentage of which are DECnet installations at factory sites.

Neither Kodak nor the vendors would comment on the terms of the agreements. Analysts estimated that both deals are long term and worth millions of dollars.

However, they were more certain of the implications. Peter Bernstein, a senior analyst at Probe Research, Inc. in Cedar Knolls, N.J., said that because of Kodak's track record as a network innovator, the deals will encourage other large users to evaluate outsourcing. "Kodak has always been on the leading edge," he said. "The fact that it has taken the plunge into outsourcing is significant."

New voice on horizon

Kodak surprised some observers by assigning control of its telecommunications network to DEC rather than IBM or its primary long-haul carrier, AT&T.

In addition to managing Kodak's DECnet factory networks, DEC will support communications links to the Systems Network Architecture networks, said Dick Pigman, DEC's program director for the Kodak project. Kodak may become one of the first large companies to use DEC's Enterprise Management Architecture offering, but details on that move have yet to be decided, a DEC spokesman said.

The network is not expected to undergo any drastic changes, Pigman said. Kodak is, however, putting its long-distance business up for bid through DEC and could wind up with a different mix of carriers later this year, he said.

As part of the agreement, DEC will offer employment to about 250 Kodak employees and will purchase Kodak assets, such as telecommunications gear, required to support these activities.

Taking care of business

IBM will be responsible for day-to-day operations at Kodak's SNA net control centers here, in Colorado and Canada, as well as Kodak's regional and district locations.

IBM will manage the networks with its NetView mainframe-based net control software, according to Harry Beeth, IBM's vice-president of national services who negotiated the Kodak deal.

In all, Kodak has five SNA nets, which it eventually would like to meld into one, Pfendt said.

The SNA networks support about 55,000 Kodak employees — who use personal computers and dumb terminals — within a variety of business segments, including marketing, sales and finance.

IBM will coordinate services for Kodak through its newly formed IBM Systems Services organization (see related story, this page).

As a result of the network and data center outsourcing contracts Kodak has awarded IBM, about 325 Kodak employees are being transferred to IBM — 300 of which are involved in data center management and 25 who will support the SNA network.

While Kodak has jobbed out day-to-day network operations, the company has not surrendered total control, Pfendt said. Kodak has formed a committee consisting of representatives from Kodak, DEC, IBM and Businessland, Inc. that will hash out network strategies, he said. Businessland supports 30,000 Kodak personal computers through an earlier outsourcing agreement.

"This is required to make sure that our information technology fits our business strategies and vice versa," Pfendt said. Kodak will still be making many decisions but will look to its vendors to suggest new services, too.

New IBM unit provides outsourcing assistance

WHITE PLAINS, N.Y. — IBM last week launched a new organization to offer management and consulting services to users that decide to farm out control of their computer or network operations.

The IBM Systems Services unit will provide a range of customized services from designing and building data centers to optimizing and managing data networks, said Bill Wilson, general manager of the new organization.

In addition, the unit will provide consulting on a number of issues related to outsourcing, including the impact on MIS and personnel.

The new organization is designed to accommodate users that choose to "devote more time to their core businesses," said George Conrades, senior vice-president and general manager of IBM's U.S. Marketing and Services group.

One of Systems Services first major customers is Eastman Kodak Co., for which IBM is building and managing a data center and running a Systems Network Architecture data network.

The Systems Services unit will provide its services by organizing the skills and capabilities within IBM that can be best used to serve outsourcing customers, Wilson said. For example, the organization could arrange for consultation with an employee from IBM's systems integration group, he said.

Also, IBM's internal data processing organization will report to Wilson's group so that IBM can take advantage of the expertise there.

The Systems Services organization will report to IBM's National Service Division.

So far, Systems Services has responsibility for five contracts, including two from Kodak. Other customers include Hibernia National Bank in New Orleans, First Tennessee National Corp. and Bank South.

IBM has also been approached by other customers evaluating outsourcing, an IBM spokesman said.

— Bob Brown

FDDI at the final frontier

continued from page 1

search Triangle Park, N.C., declined to specify a ship date for commercial FDDI products.

He did say, however, that "IBM doesn't see any problems delivering [FDDI components] for the commercial market."

"We intend to have a complete product suite, including FDDI adapters, bridges, internetworking routers and gateways, as well as Station Management Software" for network management, Baltz said.

"We also intend to supply these products in a competitive time frame," he added.

IBM's participation in the commercial FDDI market could spur user demand considerably, analysts said.

Since FDDI connection costs are still high — about $15,000 to $20,000 per node — few users are buying FDDI products, noted Brad Baldwin, LAN analyst at Dataquest, Inc., a San Jose, Calif., market research firm.

"But if IBM, with its massive manufacturing capabilities, enters the market, then it's a whole new ballgame," he said. "FDDI prices could drop drastically, and we could see shipments take off within the next year to 18 months.

Thus far, NASA has encountered no performance glitches in IBM's FDDI components, according to Larry Abbott, the space station system development manager. "There were no red flags, and we were definitely looking for them," Abbott said.

The final frontier

"We've already completed the preliminary design review for the IBM FDDI hardware, and it looks very good," Lockheed's Ryland added. "We expect to achieve near program requirements on the first try. The software design review, including an OSI-based network operating system, is set to begin next month," he said.

The Space Station Freedom will be launched in 1995; it is expected to be fully manned by four to 10 astronauts a year later. Freedom's 30-year mission is to support microgravity and low-gravity experiments and to gather information about long-term human habitation in space.

IBM will supply NASA with all the FDDI network components, including bridges, gateways, fiber-optic cable, special hybrid Personal System/2 Model 80 machines, FDDI network interface adapters and ring concentrators, according to Ryland and Abbott.

The FDDI backbone will connect about a dozen IBM Personal System/2s.

These machines will be used by the astronauts, who will each do 90-day tours of duty. The processors can also operate autonomously, Ryland said.

The processors will run all the specialized applications needed for the control, maintenance and management of the space station. Those applications require FDDI's 100M bit/sec bandwidth.

Applications include Communications and Tracking, Operations Management, Guidance, Navigation and Control, Thermal Testing, and Environmental Control Life Support Systems.

IBM has begun preliminary discussions with Lynx Real-Time Systems, Inc. to use its LynxOS, a real-time OSI-based, Unix-compatible operating system, said Ken Rehm, IBM's senior engineer for space systems applications.

The network operating system has not yet been determined. So far though, IBM is using Touch Communications, Inc.'s Touch/OSI as the network operating system in its prototype processors.

The Personal System/2s will be linked to two on-board customized IBM multipurpose application computers.

"The Communications and Tracking processor, for instance, will perform all communications necessary for the downlink to earth and will track the position and movements of the space station, while the Environmental Control Life Support System processor will keep the air and water flowing to maintain life support systems for the astronauts," Ryland explained.

Space station links

All of the specialized applications, commands and files will be downloaded and uploaded via satellite links on-board the Space Station Freedom to the Space Station Control Center at Johnson Space Center here.

Completion of the space station will be an international mission, Ryland said. About 70% of the funding will come from the U.S. The remaining 30% will come from Japan's National Administration Space Development Agency, the European Space Agency and Canada's Space Agency.

In addition to its onboard gravity experiments, the space station will also serve as the support base for President Bush's new space programs such as the planned permanently manned moon base and manned missions to Mars.

AT&T slams MCI with ethics suit

continued from page 5

each week to its network from AT&T.

Last week, it was unclear how badly AT&T's lawsuit might damage MCI's reputation.

MCI and other long-distance providers have struggled since divestiture to establish themselves as legitimate, professional companies, said Joaquin Gonzalez, vice-president of global networking strategies at the META Group, a consulting firm in Westport, Conn. If AT&T is successful in its suit against MCI and makes the carrier look like a cheap operator, "it will be poison for MCI," he said.

"Absolutely nothing will kill [a large corporation] faster than a reputation for doing things in a sleazy or illegal way," Gonzalez said.

The biggest impact will likely be among users that don't have any personal experience with MCI, Gonzalez said. "If you haven't been contacted by an MCI account executive or your relationship with MCI has been dormant, and you're thinking about starting a network redesign or considering other vendors, that might knock MCI out," he said.

However, the bottom line shaping customer perception will probably be the MCI employees with whom users have had contact rather than any news of a squabble between the rival carriers, Gonzalez said.

Brian Moir, counsel for the International Communications Association, said he doubts that the lawsuit will make users hesitant about working with MCI.

"There's going to have to be evidence of a lot more going on — particularly practices that impact the business user community — before it [makes users wary]," he said.

James Blaszak, counsel for the Ad Hoc Telecommunications Users Group, also expressed skepticism that the lawsuit would have an affect on large users. "I suspect it's going to be hard to persuade [large users] that something this blatant has actually happened, and I suspect they're going to keep an open mind."

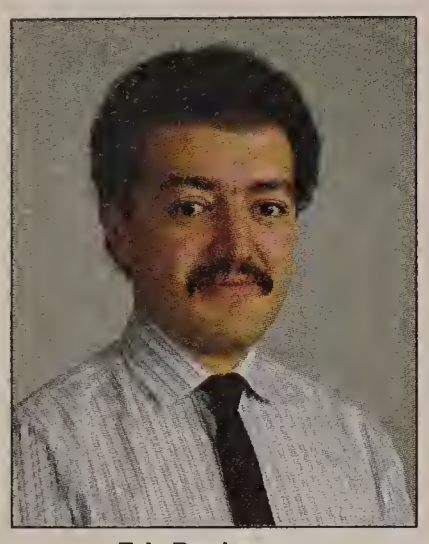
3Com behind Microsoft/IBM

continued from page 2

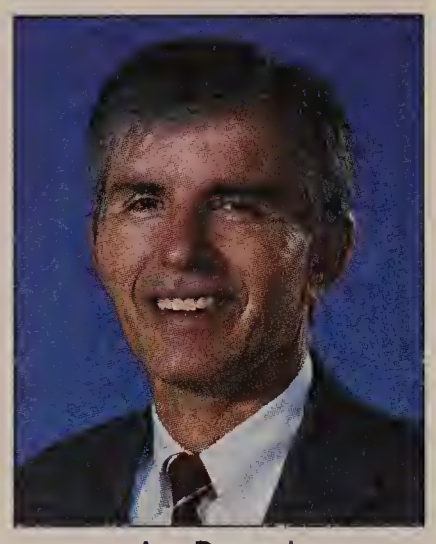
and core services, would boost third-party software developers' confidence that they could write a single version of an application to work with LAN Manager implementations, said Eric Benhamou, 3Com's new executive vice-president of product operations.

"We want to help Microsoft do with LAN Manager what it did with DOS, which is develop a binary standard that is completely accepted by the industry," he said.

3Com hopes other LAN Manager OEMs will join the effort, Benhamou said.



Eric Benhamou



Les Denend

A Microsoft spokesman said his firm welcomes 3Com's support. "We've had a solid relationship with 3Com since we began working on LAN Manager," he said. "But it's important for them to reaffirm this publicly so that software developers will write applications for LAN Manager."

Living up to expectations

The initial version of 3Com's LAN Manager offering, dubbed 3+Open, did not live up to 3Com's sales expectations. One reason was that few application developers delivered products for use with 3+Open, thus providing little incentive for users to buy it, Benhamou said. But 3Com's 3+Open Version 1.1 is selling much better.

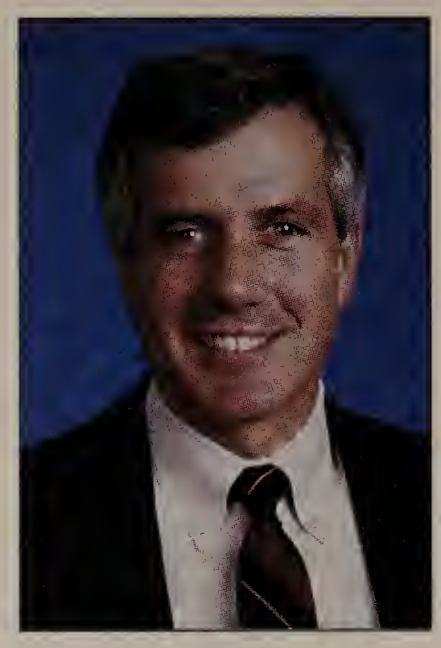
"We expect this move to result in one less inhibitor to the growth of the market," he said. "Whenever you have clear standards, [application program interfaces] and convergence of multiple vendors, it's a more conducive environment for application development. It reduces the risk ultimately to the users."

Carla Marcinowski, a senior marketing manager at Lotus Development Corp. in Cambridge, Mass., agreed.

"If we can cut down on development and quality testing because there is a single version of LAN Manager, we should be able to bring products to the market faster," Marcinowski said. Lotus' 1-2-3 Release 3 server and node editions work with both IBM's LAN Server and 3Com's 3+Open products.

New lineup

3Com also announced the reduction of its executive board from 11 members to four. The new committee includes William Krause, 3Com's chairman and chief executive officer, as well as Benhamou, Robert Finocchio Jr. and Les Denend, who were all named executive vice-presidents.



Robert Finocchio Jr.

In his role as executive vice-president of product operations, Benhamou becomes responsible for all 3Com product development, product marketing and manufacturing.

Finocchio was named executive vice-president of field operations. In this position, he has responsibility for 3Com's worldwide marketing, sales and services.

3Com appointed Denend its executive vice-president of corporate operations. He is responsible for 3Com's in-house functions.

AT&T files custom plan

continued from page 5

commit to long-term contracts or assure AT&T that they will generate high volumes of traffic. AT&T will waive a $30,000 SDN service establishment charge for customers that can show that their usage for the previous year exceeded 150,000 minutes per month. The carrier will also waive a $545 fee for Megacom orders for the same level of prior usage.

Fees waived

AT&T will also waive initial dedicated access local channel installation charges, special access line grouping charges and private network interface charges for customers that commit to at least a one-year contract. Contracts can be written for up to five years, during which time AT&T guarantees that rates won't increase.

AT&T hopes to sell SCS to state governments, which would coordinate the state agencies and universities interested in joining the network, said Carol Passavant, district manager for industry marketing at AT&T.

The plan originally filed for Michigan is similar to the SCS offer, but Passavant said she doesn't think users will have any trouble figuring out which service to choose. AT&T originally expected to offer the Michigan deal only in the one state and, therefore, the network was optimized for those users.

"The Michigan service is only generally available because the FCC insisted on it," Passavant said. "We didn't agree with the need to [make it available to other states,] but we went ahead and did it for the benefit of the customer.

> "The Michigan service is only generally available because the FCC insisted on it."
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"But we believe that for states in general, the State Calling Service will be a better service," Passavant said.

Even though the per-minute prices for on-net calls are slightly less expensive in the Michigan offer than in SCS, Passavant said the typical state user's traffic pattern would yield a larger discount under SCS.

Also SCS has several features not found in the Michigan plan — integrated discounts on intrastate calls, slightly bigger discounts on international calls, a feature that allows users to be charged on-net rates for 0+ calls made from off-net phones, and the addition of discounted Megacom service.

Superservers a threat

continued from page 2

to have to get into that business, but the question is, how do they do it without shooting themselves in the foot?" said Bruce Lupatkin, a senior technology analyst at Hambrecht & Quist, Inc., a San Francisco-based brokerage firm.

In recent months, Compaq Computer Corp, as well as startups Auspex Systems, Inc. and NetFrame Systems, Inc., have unveiled superservers. Industry analysts said these offerings will fill a void in the local-area network server market left open by personal computers, minicomputers and mainframes.

The average number of workstations supported by servers today is 15, but that number is expected to grow to 40 by 1990, said Nina Burns, vice-president at Infonetics, Inc., a Santa Clara, Calif.-based market research and network equipment testing firm. This trend, coupled with the move to next-generation LAN operating systems such as NetWare 386 and OS/2 LAN Manager, makes clear the need for superservers, she said.

"Users will purchase new operating systems to create larger networks, and they need more powerful servers to make these systems complete," Burns said in a recent report on servers.

Users are seeking a cost-effective server that is powerful enough to handle increased traffic on their LANs, said Hilly Fuchs, director of information systems development at Continental Grain Co. in New York. Continental Grain is currently evaluating whether to install Compaq's SystemPro superserver offering.

"With the growing need for speed and power on LANs," he said, "it's almost as if you've got to stretch to find a reason to reject using a superserver."

Sticking with tradition

Computer vendors insist their existing offerings already provide the benefits promised by superservers. Where existing products fall short, they say they merely need to make alterations, not start from scratch with newly architected products.

"In my opinion, it's not a new market," said Joan Ross, manager of server marketing for DEC's Entry Systems Business.

She said DEC offers a range of servers, as well as microcomputers and minicomputers that can be used as servers, to support users' rapidly expanding LANs. DEC also offers a wider selection of application software and has a larger, more experienced support team than any of the so-called superserver vendors, she said.

Still, given the stir created by the recent superserver announcements, Ross conceded that DEC might need to do a better job of positioning itself as a supplier of competitively priced servers.

Last fall, IBM gave a glimpse of how it may satisfy user demand for more powerful network servers at a demonstration at the Comdex/Fall '89 show in Las Vegas. The company showed off a dressed-up version of its Intel Corp. 80386-based Personal System/2 Model 80 microcomputer running as a superserver ("Vendors wage PC bus war on LAN superserver front," *NW,* Nov. 20, 1989).

But that demonstration doesn't mean IBM plans to position its Personal System/2 as a superserver, said Warren Peake, senior product administrator for LAN marketing at the computer maker's Atlanta office. He described the Personal System/2 as a possible platform.

"If our customers demand high-performance servers, we will participate in that market," Peake said. "But the marketplace is just beginning to unfold."

"IBM is hardly ever the first to get into a market," said Gary Kwok, vice-president for sales and marketing at LanQuest Group, a San Jose, Calif.-based systems integration and product testing firm. "They usually see what the market trend is, then put all the horses in there."

Richard Villars, an analyst at International Data Corp., a Framingham, Mass.-based market research firm, said IBM, as well as other traditional computer makers, will not change their product lines drastically to compete.

"They'll respond with repackaged versions of their current products," he said.

While most analysts agreed with Villars, they said users probably won't be satisfied with reconfigured products.

"Souping up existing computers makes users skeptical," said John Cellini, principal with JVC Technologies, Inc., a Wayne, Pa.-based systems integrator. "They see superservers designed from the ground up to be more reliable than souped-up products. To be successful in this market, you have to offer a whole different engineering technology."

In addition, traditional vendors would have difficulty entering the superserver market in a timely fashion because they are restricted by their proprietary architectures and product development operations, Cellini said.

"Small companies [such as NetFrame and Auspex] are more able to change as the market changes," he said.

"I don't believe IBM, DEC and other traditional manufacturers are going to switch [to superservers]," he added. "They're going to ride this out and lose a big share of that market."

Some observers said IBM and others may be hesitant to join the superserver fray for fear of cannibalizing sales of their minicomputers. These vendors would rather sell general-purpose minicomputers, which have better profit margins, than offer a superserver that sells for much less.

"It's just a question of whether IBM is going to take [away Application System/400 sales from itself] or give the sales to somebody else," Burns said.

By the time computer vendors figure out whether they want to enter the superserver market with new offerings or remarket their existing products, the early superserver vendors will have grabbed a market lead, said Jeff Hudson, vice-president of sales and service at NetFrame.

"By the time they enter the market, we will have gained a competitive edge and we'll be introducing improved server products," Hudson said.

Farming out nets triggers issues

continued from page 4

Employees would be compensated according to their job classification and how long they had been at the company, according to Gary Biddle, vice-president of information and systems technology at American Standard.

The compensation ranged from two months' to a year's pay and was contingent upon the employees staying until the last day of operation.

Because of these steps, American Standard lost only two people in the 16 weeks it took to farm out the operations.

"You have to give people a good financial incentive to stay," Biddle said. "What works is nothing else but dollars."

Henry Pfendt, director of Information Technology Services at Eastman Kodak Co., said it's important to be honest with employees from the start and reassure them that a decision to farm out networking functions is not a reflection of poor work on their part.

Kodak is in the process of transferring more than 600 employees to MCI, IBM and Digital Equipment Corp. in the wake of three separate agreements to job out management control of its data center and communications facilities (see "Kodak turns nets over to IBM and DEC," page 1).

While employees were initially shocked and unhappy about the decision, few have left and almost all have agreed to accept positions in the vendor companies, Pfendt said.

"We told our people they had done an outstanding job and that our decision wouldn't hurt them financially or professionally," Pfendt said. "We said the company simply didn't want to be in the business [of running networks or data centers] and asked for their cooperation."

To ensure a smooth transition, Kodak put managers through intensive three-day training programs on negotiating partnership agreements.

Moreover, many members of the vendor companies also attended the training programs along with the people from Kodak.

"We didn't want adversaries; we wanted allies," Pfendt said. "We found that getting people to bump shoulders fostered mutual trust and teamwork. All of a sudden, Kodak, DEC and IBM blurred into one."

> "You have to give people a good financial incentive to stay," Biddle said.
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HP rolls out RISC servers, software

continued from page 1

Off-loading these tasks to the microcomputer preserves processing cycles on the server and enables the server to support more users, he said.

Server lineup

The new server line consists of 10 HP 3000 minicomputers that run HP's MPE/XL operating system and one HP 9000 that runs HP-UX, HP's version of Unix.

Each of the new HP 3000 servers comes bundled with an Ethernet adapter board, as well as HP's NewWave System Services, Networking Services and its new VPLUS/Windows Server software.

Networking Services includes OfficeShare server software, which is an MS-Net-based LAN operating system that supports microcomputers running OfficeShare client software. HP plans to release this spring a version of Networking Services that supports its version of 3Com Corp.'s 3+ Open and Microsoft Corp.'s LAN Manager.

Networking Services also supports HP's microcomputer-based NetWare gateway software, which enables microcomputers on a Novell, Inc. NetWare LAN to access HP 3000-based servers.

NewWave System Services enables LAN-attached microcomputers to use an electronic mail package running on an HP 3000-based server to access HP 3000-resident files and peripherals.

The HP 9000-based server is bundled with HP's Network File System Services, HP's ARPA Services and X/Windows software packages, plus an Ethernet adapter board.

The software links the HP 9000 to Transmission Control Protocol/Internet Protocol nets.

HP said it is hoping the VPLUS/Windows software will set its servers apart from the competition.

> HP said it hopes the VPLUS/Windows software will set its servers apart from the competition.
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The new package builds on HP's existing VPLUS software, which runs on HP 3000s and enables software developers to build a consistent user interface for multiple HP 3000-based applications.

VPLUS/Windows will enable users to move those functions off HP 3000 servers to microcomputers by simply recompiling their existing HP 3000-based applications.

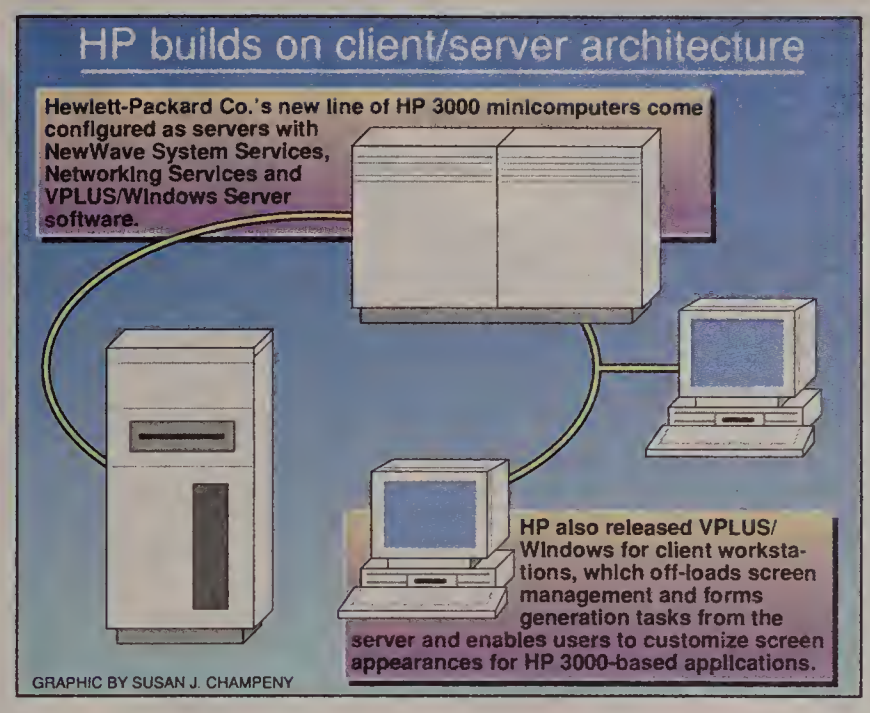
This will give microcomputer users more functionality than a simple terminal emulator when accessing HP 3000-based applications and data. "While it's orders of magnitude beyond a terminal emulator, functionally, that is what VPLUS/Windows is doing," Cameron said.

IBM offers a product that is similar to VPLUS/Windows called Easel for Operating System/2 Extended Edition. Running on OS/2-based microcomputers, the product accepts IBM 3270 data screens downloaded from an IBM host to an OS/2-based microcomputer emulating an IBM 3270 terminal.

Those screens are then displayed by Microsoft's Presentation Manager. Like Easel, with VPLUS/Windows, the HP server is only transferring data over the LAN to the microcomputer, which creates a screen, plugs data into the appropriate fields and displays the results in windows on the microcomputer monitor.

The HP 3000 server line ranges in price from $35,000 to $485,000, depending on configuration. The HP 9000 server costs $84,500.

Purchased stand-alone, the VPLUS/Windows server software ranges from $1,000 to $9,800; VPLUS/Windows client software costs $150.



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